ECONOMIC IMPACT OF TOURISM ON TOMPKINS COUNTY ECONOMY: SOCIAL ACCOUNTING MATRIX AND STRUCTURAL PATH ANALYSIS APPROACHES

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Pannarai Chingchitr

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ABSTRACT

Tourism has been regarded as a key economic driver in both developed and developing nations due to its potential for income and employment generation. The present study finds that – based on 2006 Tompkins County, New York, data – tourism has a marginal role in the local economy. The estimated revenues from tourism accounted for a little over two percent of the 2006 regional gross domestic product (RGDP), while in 2009 the economic recession causes the industry to contract by less than one percent of the County's RGDP. Impact analysis based on Social Accounting Matrix multipliers framework suggests that such contraction reduces household income by only 0.13 percent. Nonetheless, the combination of the loss of tourism factor income and a 10 percent decline of tourism input expenditures results in a 6.3 percent decline of household income. Structural Path Analysis reveals that in general the impact of a tourism shock is transmitted to household groups on a direct path with relatively small path multipliers. The paths therefore indicate that any shocks to tourism sectors affect households directly through factor incomes. At the same time, the multiplier impact of a tourism shock on household income is typically found to be marginal. The present study concludes that the impact of tourism activities is smaller than that of other Tompkins County activities.

BIOGRAPHICAL SKETCH

Pannarai Chingchitr grew up in Trang, a small southern province of Thailand. She came to Bangkok to spend her high school year at Samsen Wittayalai School and later went on to attend Thammasat University. After graduating with a Bachelor of Arts in English, she went to work at Central Samui Beach Resort in Samui Island, one of the best known tourist destinations in Thailand. Back then Samui was still a quiet island paradise known to only a few tourists outside Thailand, mostly European backpackers. She still remembered the excitement of taking a "song-taew" (a pick-up truck taxi) across the island for a "going-into-town" trip and a visit to the only Seven Eleven shop for a cup of Slurpee and a Dunkin' donut. She stayed in Samui for only six months, but long enough to see how the island has changed from tourism expansion. After a brief period in the tourism industry, she came back to Bangkok to work at Bangkok Metropolitan Administration (BMA) in the International Affairs Division, Office of the Permanent Secretary to the BMA, where she received a scholarship to pursue a master's degree in Regional Science at Cornell University. Coming to Cornell had given her many new experiences including seeing (lots of) snow for the first time, attending lectures by important people in various fields, baking late night cookies with her roommates during exam periods, doing serious research work, and writing about herself in a third-person voice. After graduation, Pannarai expects to return to her job at the Bangkok Metropolitan Administration with hopes to put her new-found knowledge and skills into work.

To my parents

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LIST OF ABBREVIATIONS

ADMIN	Administrative Services
AGRI	Agriculture
AUTO	Automotive Rental
B&B	Bed and Breakfast (Inns)
COMNG	Company Management
CONS	Construction
CPI	Consumer Price Index
EDUC	Education Services
EMCOM	Employee Compensation
ENTR	Entertainment and Recreation
FIFA	Federation of International Football Association
FININ	Finance and Insurance
FOOD	Food and Drinking Places
GDP	Gross Domestic Product
GPTP	Ground Passenger Transport
HEAL	Healthcare
HHL	Households LT10k
HHLL	Households 10-15k
HHLLL	Households 15-25k
HHM	Households 25-35k
HHMM	Households 35-50k
HHMMM	Households 50-75k

HHR	Households 75-100k
HHRR	Households 100-150k
HHRRR	Households 150k+
HOTEL	Hotels and Motels
IMPLAN	Impact Analysis for Planning
INFO	Information
I-O	Input-Output
LQ	Location Quotient
MANU	Manufacturing
MIG	Minnesota IMPLAN Group
MINE	Mining
NAICS	North American Industry Classification System
OTAC	Other Accommodations
OTSV	Other Services
OTTI	Office of Travel and Tourism Industries
PRINC	Proprietor and Other Property Type Income
PROFT	Professional and Technical Services
PUBAD	Public Administration
REAL	Real Estate
RETRD	Retail Trade
RPC	Regional Purchase Coefficient
SAM	Social Accounting Matrix
SNA	System of National Accounts

SPA	Structural Path Analysis
STPB	Strategic Tourism Planning Board
TRNPT	Transportation
TRSRT	Tourism Related Retails
TRSSV	Tourism Related Services
TSA	Tourism Satellite Account
UNWTO	World Tourism Organization
UTIL	Utilities
WHOL	Wholesale Trade
WTTC	World Travel and Tourism Council

CHAPTER 1

An Introduction to Tourism Industry and Economic Impact Analysis

1.1 Background

The importance of tourism in economic and regional development has grown significantly in recent history. Data suggest that tourism has become one of the largest and most important industries in many developed and developing countries, with its business volume equaling or surpassing those of key sectors such as automobile manufacturing, food production and oil exports (World Tourism Organization UNWTO 2011). The World Travel and Tourism Council (WTTC) noted that tourism has become the world's largest industry in terms of many economic measures such as gross output, value added, capital investment, employment, as well as tax contributions (Theobald 1994). The latest report from WTTC demonstrates that as of 2009 there are more than 225 million people employed in the travel and tourism industry around the world, generating 9.6% of global GDP in 2008 despite the industry downturn at the end of the year (WTTC 2009). In the United States, travel and tourism accounted for 2.8% of the national GDP in 2009. In comparison, other major industries such as agriculture, motor vehicle manufacturing, construction, and finance and insurance accounted for 1.37%, 1.4%, 4.4% and 9.1%, respectively (Bureau of Economic Analysis 2011). Moreover, travel and tourism industries generate 7.81 million jobs and $1.24 trillion in sales (Office of Travel and Tourism Industries 2011). These impressive facts and figures support the claim that tourism has become a key sector for economic development due to its potential as an employment and income

generator with minimal investments requirement in public infrastructure or marketing (Fletcher 1989; Sinclair 1998; Tooman 1997).

The U.S. Office of Travel and Tourism Industries (OTTI), of the Department of Commerce, reported that due to the recent economic recession the travel and tourism industry in 2009 had suffered the worst performance since the 9/11 terrorist attack in 2001 with a 15% or about $21 billion decline in international tourist spending (Office of Travel and Tourism Industries 2011). The dramatic fall in U.S. travel and tourism income due to international tourist spending during the last decade are illustrated in Figure 1.1.

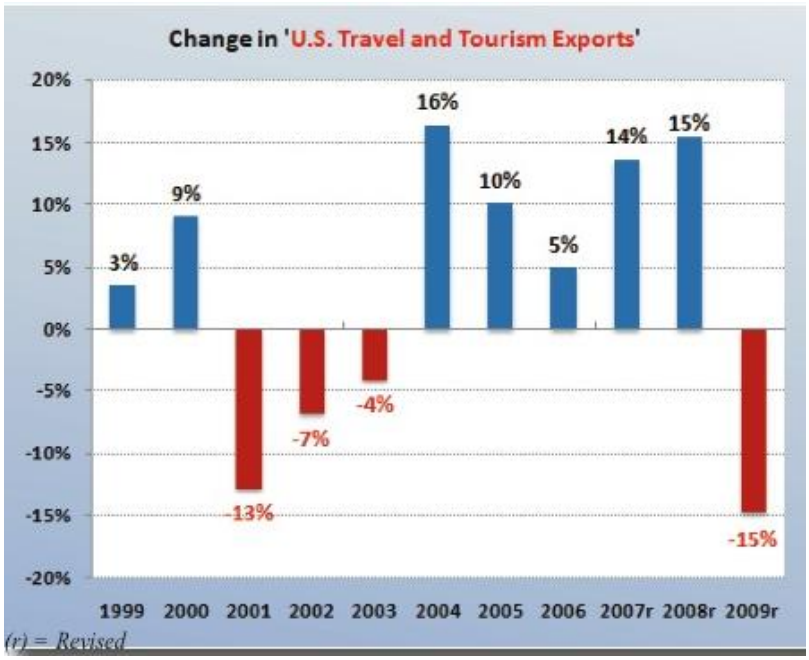


Figure 1.1: Changes in U.S. Travel and Tourism Exports (1999 – 2009)
Source: Office of Travel and Tourism Industries.

Ritchie et al. (2010) have studied the impacts of the economic crisis on tourism in North America and found results that are in line with the statistics given by the OTTI. They found that "Real Direct Tourism Output" – the inflation adjusted values of tourism products sold to domestic and foreign travelers – has grown at the rate of 3.7% annually since September 11

incident and reached its peak in the second half of 2007. In comparison, the national real GDP grew at 2.7% per year during the same period. However, since its peak in the third quarter of 2007, tourism output has been steadily in decline due to the economic recession and reaches the lowest level since 2001 in the first quarter of 2009. In this six-quarter period, real tourism demand fell by 6%, which is twice the rate of the decrease in real GDP (Ritchie et. al 2010). According to a report on the 2009 economic impact of tourism in New York State's Finger Lakes Region, the tourism industry in New York State is affected by the economic recession as reflected by the decline in the numbers of visitors as well as per trip spending. The Finger Lakes Region, which encompasses Tompkins County, experienced a 7.9% contraction of visitor spending in 2009 (Tourism Economics, 2010). These records suggest that the travel and tourism industry is sensitive to the changes in economic climate as is obvious in the recent down-turn. This observation is confirmed by VanBlarcom and Backman (2007) who note that tourism, perceived as a luxury good with highly-elastic demand, is sensitive to price and economic fluctuations.

Because of its potential as an income and employment generator as well as its strong linkages with other industries through input requirements, the tourism industry' s volatile nature is often overlooked by or does not produce an immediate concern to government agencies who seek alternative policies for local economic development especially in times when investment budgets are limited. In Tompkins County, the attempt to promote local tourism has been strong and consistent over the years. The Tompkins County Board of Representatives in 2002 adopted the Vital Communities Initiatives declaring as one of its principles the communities' support for tourism to enhance local economic development and to foster strong communities (Tompkins-co.org 2011). In May 2010, the Tompkins County Legislature's Strategic Tourism Planning

Board (STPB) released a profile of the county's visitors from the data collected from December 2008 to November 2009, the period of nation-wide economic crisis. The visitor profile reveals that in 2009, 843,000 visitors visited Tompkins County and spent approximately $156 million with the average spending per person per trip of $185 (Chmura Economic & Analytics 2010).

To expand tourism activities and income, the STPB has implemented a program providing tourism grants to various projects and initiatives of local businesses whose interests are aligned with the STPB objectives of attracting potential tourists to the area and ultimately stimulating the County's economy. The grants are funded from the room tax that visitors pay when they stay in hotels or other types of lodging in the area. The tourism grants for 2010 are approximately over $80,000 for small initiatives, while capital grants for large-scale projects are also available on a multi-year basis (Tompkins-co.org 2010). In spring 2011 alone the STPB awarded tourism grants to 34 businesses and projects including several cultural and trade events aiming to draw people into the region.

The positive moods and hopes towards tourism as an economic driver for Tompkins County were also portrayed in a recent article in a local newspaper on how cultural amenities possess strong potentials for local community revitalization. An article in the *Ithaca Times* on June 9, 2011, quotes a professor in the City and Regional Planning Department at Cornell University saying that arts and culture generate economic activity through tourism and it could "create vibrant public spaces, improve the quality of life, expand the business and revenue base and contribute to positive regional and community image." Furthermore, in a roundtable talk on the topic of promoting arts, culture, and historic sites as a resource for economic growth and job creation, Wendy Gellman, senior counsel and senior policy advisor to New York State's Senator

Kristen Gellibrand states that culture is a crucial tool for economic development and that the New York's Southern Tier economy can be stabilized through tourism (Khromov 2011).

1.2 Definition of Tourism and Its Benefits

Defining tourism has always been a major problem for researchers due to tourism's diverse and fragmented nature, which in turn leads to complications in identifying its true economic impact (Fletcher 1989; Theobald 1994). Gee et al. (1989) stress the importance of defining the term "tourism" by stating that without a standard definition, "there can be no agreement on the measurement of tourism as an economic activity or its impact on the local, state, national or world economy". Yet many researchers find it difficult to define what tourism or the tourism industry is (Theobald 1994; Mill and Morrison 2002; Smith 2010). Vanhove (2005) observes that there is a distinction between the conceptual and statistical definitions of tourism. One of the oldest conceptual definitions of tourism used in literature is given by pioneers in tourism research. For example, Hunziker and Krapf define the term as "being a sum of relations and phenomena resulting from the travel and stay of non-residents, in so far a stay does not lead to permanent residence and is not connected with any permanent or temporary earning activity" (quoted in Vanhove 2005, 2).

The more modern definition which is widely accepted today as both a conceptual and statistical definition of tourism is due to the World Tourism Organization (WTO), an agency mandated by the United Nations to collect, organize, as well as analyze tourism statistics among its 157 members. For the WTO, tourism is defined as "the activities of persons traveling to and staying in places outside their usual environment for not more than one consecutive year for leisure, business, and other purposes" (Smith 2010). To these days, this definition is widely used

by most national statistical offices because of its practicality. The WTO definition excludes commuting trips between home and workplaces but includes travel for businesses, employment-related trips as well as other trips for religious, education or medical purposes. These non-leisure trips would be included by Hunziker and Krapf's definition. Nevertheless, there are still some difficulties in measuring tourism data. In his book Quantitative Tourism Industry Analysis, Tadayuki Hara (2008) quotes John Latham, a specialist in tourism statistics, who characterizes tourism data as "being estimates, subject to several errors and produced with differing levels of accuracy. Sources or estimates of errors are seldom provided in tourism statistics' reports. Tourism statistics are fraught with problems of definition, partly because tourism is a composite industry, made up of several other industries, which render its measurement complex". Hara (2008) further explains that it is not appropriate to consider tourism as a single industry but rather an industry that incorporate many industrial sectors which also serve the non-tourism demands. An example of a taxi service is given to illustrate that taxis are used by both tourists and locals and there is a decision to be made how much of the service is attributed to tourists or non-tourists to distinguish the tourism output from a particular industry's. This distinction has led to a development of a new framework to measure tourism output within an economy called Tourism Satellite Account (TSA). There are many works discussing the development and usefulness of the TSA such as those of Frechtling (1999 and 2010), Vanhove (2005), Libreros, Massieu and Meis (2006), and Hara (2008).

Tourism is perceived to have many benefits to the host regions. Goeldner and Ritchie (2009) extensively list advantages of tourism in various aspects. Among them, the economic benefits are the facts that tourism i) provides employment opportunities both for the skilled and unskilled due to the labor-intensive nature; ii) generates higher gross national product and

government revenues; iii) contributes to economic diversity; iv) enhances the spread of development; and finally, v) it can be built upon readily available resources in the area and complement existing economic activities. However, the authors also identify the downsides of tourism that often come with overdevelopment. For instance, i) excessive tourism could cause inflation; ii) lead to economic fluctuations; iii) induce an unbalanced development; iv) increase vulnerability to changes in economic as well as political climate. These pros and cons show that it is crucial to properly plan and manage tourism so as to maintain the favorable impacts and limit the unfavorable ones. One way to keep track of tourism with respect to its impacts on a local area development is to conduct an economic impact analysis.

1.3 Previous Studies on the Economic Impact of Tourism

Daniel J. Stynes (1997) defines an economic impact analysis of tourism as a method for tracing the monetary flow associated with a regional tourism activity to assess the income and employment as well as other changes in the economy. Additionally, he lists several applications for tourism economic impact analysis such as i) to evaluate changes in tourism supply and demand; ii) to evaluate policy impact on tourism activities; iii) to identify economic structure and inter-linkages between different industrial sectors; iv) to compare the impact of tourism with other economic activities for resource allocation; and finally v) to provide evidential support for policy that encourages tourism growth and development. Tyrell and Johnston (2006, 3) describe that the most common aim for economic impact analysis of travel and tourism is "to estimate changes in regional spending, output, income, and/or employment associated with tourist policy, events, facilities, or destinations".

Fletcher (1989) notes that there are varieties of methods employed in order to examine the impact of tourism and the selected method is often dependent on the focus of the research, data availability, structure of the region of study, and other constraints but one of the most popular techniques is input-output (I-O) analysis. He further identifies advantages of using I-O analysis in studying economic impact of tourism that it provides a comprehensive view of the economy which is useful for policy makers. Moreover, the I-O framework focuses on the linkages or interdependencies among various industrial sectors in the economy and it has a flexibility that allows researchers to construct a model to suit their particular interests.

The I-O model for economic impact study works on the basis of inter-industry linkages and a multiplier effect. The economic impact from any initial change or an exogenous shock depends largely on the interdependencies of industries and households and the degree of these linkages is observed in the size of the multipliers. The injection or money received is circulated in the economy from many rounds of spending and re-spending. At the same time, there are leakages in the system where money flow out of an economy, such as due to imports, public and private savings, and tax payments. The process of money spending and leaking out continues until the initial amount of injection flows out of the regional economy. This relationship between an initial change and the total change is quantitatively estimated by multipliers (VanBlarcom and Backman 2007).

There are numerous studies employing I-O model for tourism impact analysis for various purposes. For instance, during the late 1980s to the end of the twentieth century most of the studies on economic impact of tourism focused on estimating the impacts of visitor spending in terms of output, employment, and value-added generated in a particular region such as Port of Miami (Mescon and Vozikis 1985), Singapore (Heng and Low 1990), Bermuda (Archer 1995),

Seychelles (Archer and Fletcher 1996), and Israel (Freeman and Sultan 1997). The later researches have often focused on the impacts of particular tourism events or niche segments such as music festivals (Brown Var and Lee, 2002); wine and food festivals (Cela, Knowles-Lankford, and Lankford 2007), historical tourism (Strauss and Lord 2001), the Olympic Games (Kasimati 2003; Kirkup and Major 2006; Porter and Fletcher 2008), FIFA World Cup (Baade and Matheson 2004; Lee and Taylor 2005), and conventions and exhibitions (McHone and Rungeling 2000).

An alternative approach to economic impact analysis of tourism extends input-output model into the Social Accounting Matrix (SAM) framework. Developed originally by Sir Richard Stone, the SAM incorporates all other key activities and forms a comprehensive structure of an economy in a matrix format as observed in industrial input-output table (Hara 2008). John E. Wagner's "Estimating the Economic Impacts of Tourism" (1997) gives a detailed account on the construction of Social Accounting Matrix and its application to the study of economic impact of tourism in a Brazilian region. Wagner indicates that the SAM is useful in a sense that it not only considers the demands for intermediate input of various production activities as in I-O model, but also includes the demands for production factors as well as household consumptions in the system. In other words, SAM provides a complete and systematic way to synthesize and display a region's economy as well as to provide an easy-to-understand method for estimating economic multipliers.

Oosterhaven and Fan (2006) give further justification for using I-O and SAM based models to analyze the economic impact of tourism. They explain that these models based exclusively on backward linkages and tourism-related industries' demands are mostly backward in nature with very little forward linkages. The attributes of tourism-related industries make it

appropriate for an analysis under the SAM or I-O framework. The authors use a SAM-based model to study tourism impact on the Chinese economy with an objective to answer a research question of the degree of China's dependency on tourism which deems suitable for the SAM static model. They find that in absolute terms the tourism impact on GDP is twice as large as the impact on household income, which amounted to 60 billion Yuan. In relative terms, however, tourism marginally contributes to the nation's gross domestic product (GDP), or about 1.6% in 1997. The impacts of tourism on household income as well as on employment are even smaller than the impact on GDP; only 1.4% and 1.0%, respectively.

Other studies using a SAM-based model in tourism economic impact analysis include Guy West (1993) who integrates SAM and time-series econometric models to estimate the impact on gross state product and employments of Queensland, Australia. Polo and Valle (2008) study the impact of the fall in tourist arrivals in Balearic Islands region in Spain and compare the results obtained from I-O and SAM based model. Their findings from a SAM-based model, both the estimated value-added and employments generated, are larger than the estimates from I-O model due to the SAM model closures with respect to households and investment.

Although there are a large number of studies on the economic impact of tourism employing I-O and SAM based models, surprisingly there are only few researches on how tourism *demand changes* affect the tourism-related industries and what impacts it causes to the regional economy (Baynon, Jones and Munday 2008). Furthermore, Li and Lian (2010) note that research on tourism impact on income distribution using Social Accounting Matrix framework is still lacking. Among the few researches using SAM models to study the impact of tourism on income distribution are Mansury and Hara (2007) who study the impact of agritourism in Liberty Trade Area of Sullivan County in New York State. They simulated

different scenarios with respect to different regional purchase coefficients (RPCs) and levels of tourism demands. Their findings demonstrate that higher RPCs generate higher income due to multiplier effects. Additionally, the higher RPCs together with increased tourism demands will lead to higher incomes among all households and at the same time induce a more equitable distribution in which the lowest income households gain relatively higher income than other household types.

Another study regarding tourism and income distribution is Blake's "Tourism and Income Distribution in East Africa" (2008). Blake's study is not a tourism impact analysis *per se* but rather a study that uses SAM data for tourism linkages analysis. This research is under a hypothesis that households' benefit from tourism depends on the degrees of linkages of each household group with tourism-related industries. By examining backward and forward linkages of tourism-related industries as well as other non-tourism export activities, Blake is able to identify that hotels and restaurants industry in three East African countries – Kenya, Tanzania, and Uganda – has strong backward linkages with the rest of economy while the forward linkages are weaker than other export activities. The results also suggest that tourism-related industries provide a lower-than-average share of income to poor households across three countries compared to other exports. This finding leads to the author's conclusion that tourism may not be a favorable tool for poverty alleviation in these African countries unless policies and project aiming to improve tourism-poverty relationship such as pro-poor tourism are implemented and that further research on the subjects are much needed.

1.4 Research Objectives

It has been noted that tourism has gained popularity as an alternative policy for economic development because of its perceived reputation as an effective economic driver. This trend can be observed in many areas including Tompkins County where many campaigns and projects are implemented to enhance local tourism. However, I also discover that research on the impact of tourism industry change on household income distribution are still lacking. In particular, this type of research has not been done before for Tompkins County.

This study aims to fill in the gap by examining the economic impact of the tourism industry in Tompkins County with two focuses; first, the extent of the industry change within the context of economic recession, which will be done by comparing the performance of the tourism-related sectors between 2006 and 2009 – before and after the recession. The second main focus is on the consequence of the industry change on household income. The latter focus is of a particular interest especially the distribution of income among different groups of households in Tompkins County and how a certain type of households is affected from the loss of tourism income. With the perceived characteristic of tourism as a labor-intensive industry, we expect to see a significant impact from a loss of tourism income on households especially the low-income groups who supposedly comprises a high proportion of unskilled labors employed in the tourism-related sectors. We also anticipate that the change in tourism demands would affect other industries in the economy through the input requirements of tourism sectors.

The findings from this study provide useful information to the County's policy makers regarding the tourism industry and its impact on the local economy. The goal is to assist policy makers design suitable policy programs for economic development in the region. The study is organized into five chapters in which chapter one – this chapter – starts with introduction, previous studies on tourism economic impacts, and research objectives. Chapter two provides

information on Tompkins County's economy, followed by chapter three which addresses the County's state of tourism and the industry change brought about by the recent recession. Chapter four describes the methodologies used for the economic impact study – the Social Accounting Matrix and Structural Path Analysis. Chapter five reports the model simulations and their findings. Finally, chapter six presents conclusion as well as suggestions for further research.

CHAPTER 2

An Overview of Tompkins County's Economy

2.1 A Brief History

Tompkins County is one of the 62 counties of the State of New York located in the central Finger Lakes Region with land area of 476 square miles. The County was officially formed in April 1817 and was named after Daniel D. Tompkins, Governor of the State of New York (1807 – 1817) who later became the sixth Vice President of the United States during President James Monroe's administration. Early settlers in the area were native-born farmers or migrants who moved from eastern New York to seek new land. The federal census recorded that in 1820 there were 20,609 whites, 72 non-whites – mostly African Americans – and 20 foreign-born aliens in the County. Apart from agriculture, early manufacturing in Tompkins County included printing, gristmills and sawmills. From 1825, the newly finished Erie Canal and the Seneca Canal brought along more trade with the eastern coast and at the same time more competition due to cheaper grains and other produce from the Midwest.

The population of Tompkins County during the early nineteenth century fluctuated partly due to the types of land available for agriculture and partly due to migrations to the more urban lands as well as to the west to seek new fortunes. The County's economy slowed during the civil war until the founding of Cornell University in 1865 which made the economy become more stabilized. At the end of the nineteenth century, Tompkins County was linked to other urban areas by boats, horse-drawn carriage, and four major railway lines. The County's population increased with the presence of Cornell University and Ithaca College that attracted scholars and

students from around the world (Kammen 2008). By 2010, the population had increased to over a hundred thousand of which 12% were foreign-born and 82.6% white, 4.0% black, 8.6% Asian, and 4.2% of Hispanic origin (U.S. Census Bureau 2011a). Education services as well as agriculture continue to play a major role in the regional economy. Other important industries include retail trade, construction, and food and accommodation services (U.S. Census Bureau 2011b).

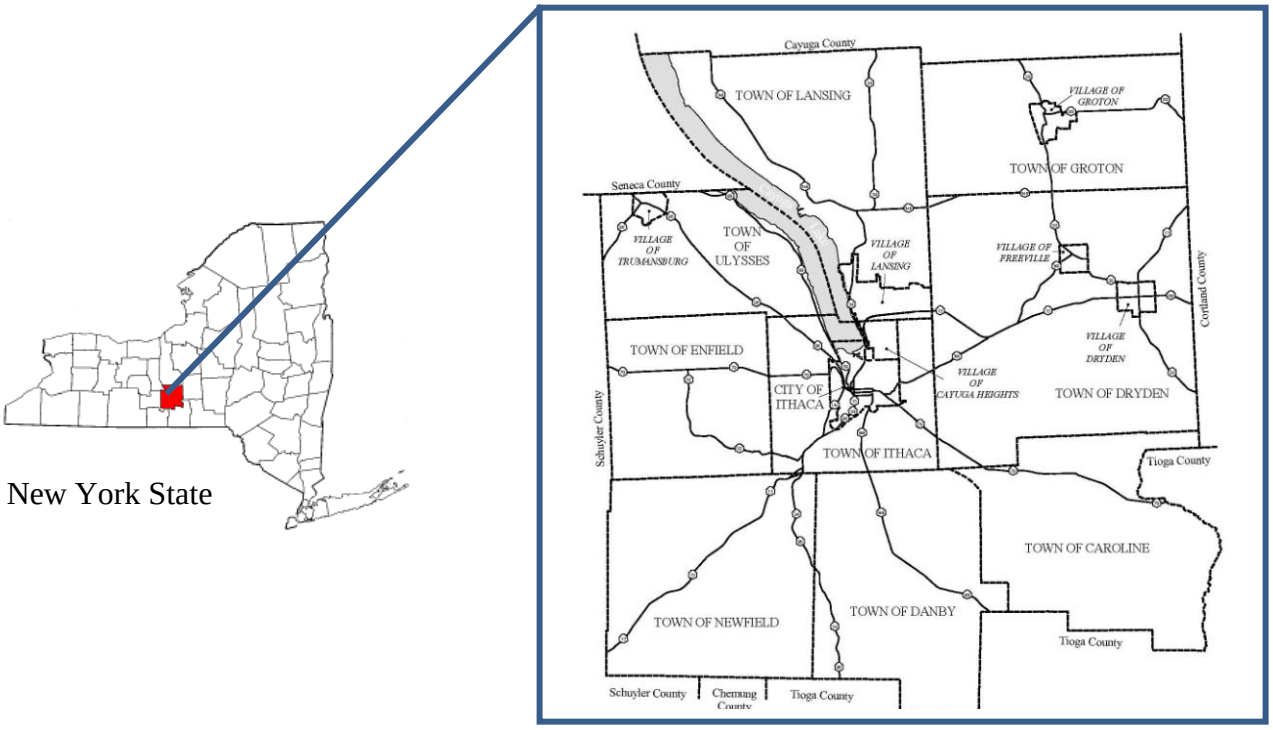


Illustration 2.1: Tompkins County Map and Its Location in New York State
Source: http://www.countymapsofnewyork.com/tompkins_county.shtml
http://www.tcad.org/files/businessInfo/TC_basemap.pdf

2.2 Tompkins County's Economy

2.2.1 Population

Population of Tompkins County has been slowly but steadily increasing since the early 1900s. At present, the US Census Bureau reports that Tompkins County has a population of 100,583 with the median age of 28.3 years. This median age is relatively low compare to the national median age of 36.5 years and this is probably due to a large proportion of students in the County. Of the people 25 years old and over, 92% have at least high school education and 49% have bachelor degree or higher. The total number of people 16 years and over in labor force is 53,042 or about 61.6 percent of the total population. The median household income for 2009 is $45,506 (inflation adjusted dollars) with the per capita income of $24,409. In comparison, the state and national median household income is $55,223 and $51,425 respectively and the per capita income are $30,634 and $27,041 respectively (U.S. Census Bureau 2011a). This means that household income in Tompkins County is approximately 18% lower than the state and 10% lower than the national level. Moreover, the County's per capita income is 20% and 10% lower than the state and national level, respectively. Due to the presence of higher education institutions such as Cornell University and Ithaca College, Tompkins County has fared relatively well in the recent recessionary economic climate with a very low unemployment rate compared to the State's 7.7% and the nation's 8.7%. The New York State Department of Labor announces that in April 2011 Tompkins County has the lowest unemployment rate of 5.3 percent among all 62 counties Figure 2.1 and Table 2.1 illustrate numbers of population and unemployment rate in Tompkins County respectively.

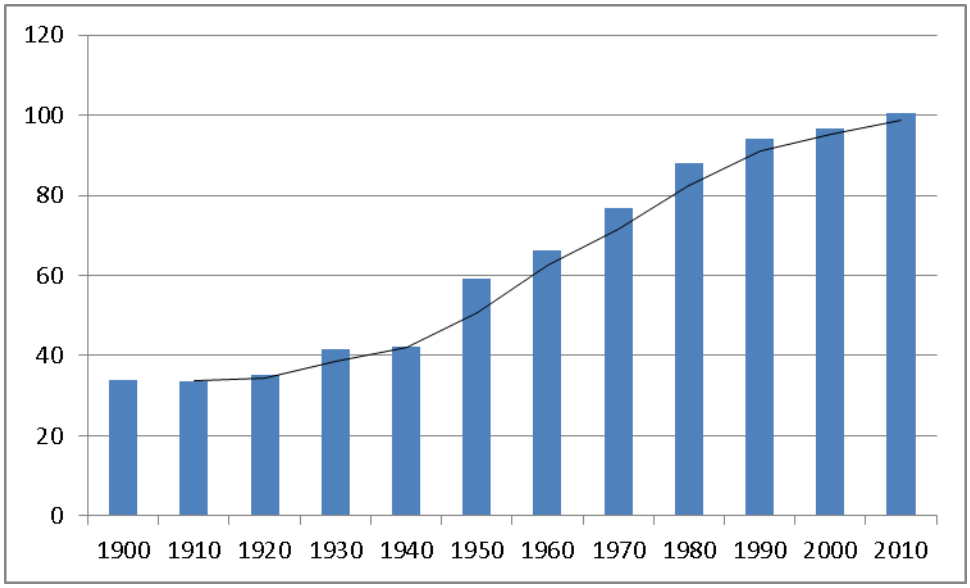


Figure 2.1: Tompkins County's Population from 1900 – 2010 (in Thousands)
Source: The U.S. Census Bureau

Table 2.1: Unemployment Rate in Tompkins County and New York State (Percentage)

YEAR	Tompkins County	New York State
2011 (April)	5.3	7.7
2010	5.6	7.6
2009	5.8	8
2008	4.6	6.3
2007	3.3	4.7
2006	3	3.9
2005	3.3	4.4
2004	3.7	4.7
2003	3.9	5
2002	3.8	4.9
2001	4	5
2000	2.9	3.4

Source: New York State Department of Labor

2.2.2 Households and Income Level

The data for households categorized by income level is obtained from the IMPLAN data. IMPLAN, which stands for Impact Analysis for Planning, is an economic modeling software

developed by the USDA Forest Service together with the Federal Emergency Management Agency in the 1970s. The program is widely used to analyze many shock scenarios including the impact of new public policy, new factory locations or plants closing, and tourism revenue (MIG Inc. 1996). The IMPLAN data are collected from various government sources including the U.S. Census Bureau, Bureau of Economic Analysis, and Bureau of Labor Statistic. The records from an IMPLAN data file for Tompkins County in 2009 show that there are 38,962 households categorized into nine groups by levels of income as shown in Table 2.2 and Figure 2.2.

Table 2.2 Tompkins County Households by Level of Income

Total Households: 38,962		% of Total	Cumulative %
HH LT10k	4,840	12.4	12.4
HH $10-15k	3,133	8.0	20.5
HH $15-25k	5,688	14.6	35.1
HH $25-35k	4,732	12.1	47.2
HH $35-50k	6,081	15.6	62.8
HH $50-75k	7,220	18.5	81.3
HH $75-100k	3,100	8.0	89.3
HH $100-150k	2,723	7.0	96.3
HH $150k+	1,445	3.7	100.0

Source: 2009 IMPLAN Data File for Tompkins County

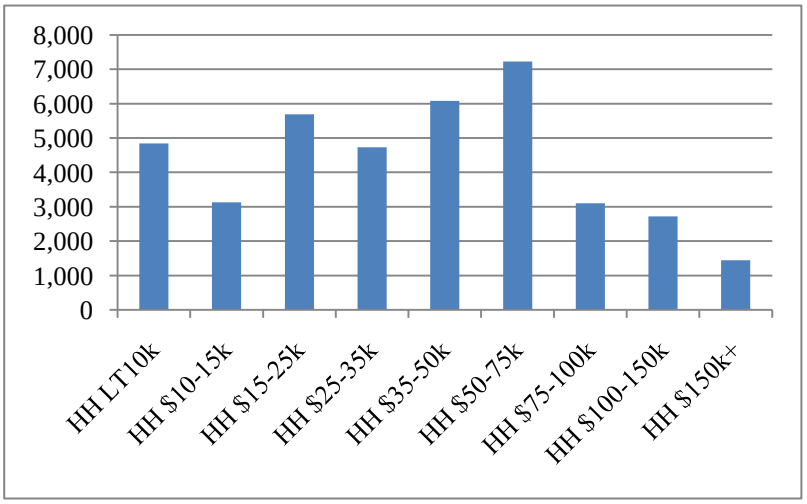


Figure 2.2: Household Groups by Level of Income in Tompkins County for 2009

The largest household group falls into the income category of $50,000 – $75,000 followed by that of $35,000 – $50,000. The smallest group is those with the highest incomes of more than $150,000. For this study, we consider the bottom three household groups as low income; the next three groups as middle income; and the top three groups as high income. With these three aggregated categories, there are 35.1% low-income, 46.3% middle-income, and 18.7% high-income households in the County. The data from Census Bureau further reveals that Tompkins County has 16,715 or 18.8% people below poverty level which is relatively high compare to the state's 14.2% and the nation's 14.3%. In fact, the County's poverty rate is the third highest among 62 counties in New York State after Bronx (28.3%) and Kings (21.7%) counties. The 2009 threshold for poverty level as specified by the Census Bureau is $10,956 for one person (unrelated individual) and $13,991 for two-people households (Census, 2011a). The average size of households in the County is 2.33. These figures regarding poverty level are somewhat misleading because Tompkins County has a high proportion of student population, which results in the high percentage of persons below poverty level. Therefore it cannot be concluded there are more people living involuntarily below the poverty line or having lower quality of life in Tompkins County than in New York State or the Nation.

2.2.3 Tompkins County Economic Base Analysis

This section explores the economic structure of Tompkins County using economic base approach to identify the major industries in terms of employment. Economic base analysis has been regarded as a useful tool that assists policymakers and researchers to understand the basic structure of a region's economy by categorizing local industries into two components, the basic and non-basic sectors. The early economic base theory has been put forth by Homer Hoyt and

Arthur Weimer who describe in their book *Principles of Real Estate* (1960) that economic base theory is an approach to determine basic employment and to calculate of ratios between employments in basic and service segments (Wang and vom Hofe 2007). This approach is still used by many researchers today. Richard B. Andrews describes that the basic sector comprises industries that draw income into the region from their exports of goods and services to the surrounding regions while the non-basic or service sector comprises those that mainly support the local needs (Andrews 1953). One of the most simple and easy-to-use economic base analysis techniques is the Location Quotient (LQ) method. Location Quotient is used to identify a region's specialization relative to a benchmark region to compare, usually through comparing industry's employment. This study calculates the LQ employing the following formula.

$$LQ_i = \frac{e_i}{e} \Big/ \frac{E_i}{E} = \frac{Share\ of\ regional\ employment\ in\ industry\ i}{Share\ of\ benchmark\ area'\ employment\ in\ industry\ i}$$

where e_i = regional employment in industry *i*;
e = total regional employment;
E_i = employment in industry *i* in a benchmark area;
E = total employment in a benchmark area.

An LQ greater than 1.0 means industry *i* has a greater share of employment than the benchmark area, and therefore is regarded to be an exporting or basic sector. The higher the LQ, the more the region specializes in the particular industry. If the LQ equals 1.0, it means industry *i* produces just enough for local consumption, and hence neither exports nor imports its products. An LQ smaller than 1.0 indicates that industry *I*'s share of employment is smaller than the benchmark's and is considered an importing or non-basic industry. However, it should be noted that the Location Quotient is an indicator of relative employment concentration in areas being

compared. In other words, the LQ indicates that the industry is significant to the local economy on a relative basis to the benchmark area. The LQ greater than 1 does not necessarily imply that an industry is exporting but it may be the fact that the local area has high demand for the output of that industry.

The LQs for Tompkins County industries at the 2-digit NAICS level are calculated from the data obtained from the County Business Pattern for 2008 with New York State as the benchmark area. We find that the data from the County Business Pattern does not provide the employment figures for Mining and Education Services in Tompkins County due to non-disclosable information. However, Education Services is an important sector in Tompkins County so it is worth exploring further and we will do the same for Mining sector. For the calculation, we use 17,500 and 175 – the midpoint of employment range J (10,000 – 24,999 employees) and range C (100 – 249 employees) – as a proxy for employment in Education Services and Mining. The employment range for both sectors is given by the County Business Pattern, US Census Bureau. It should be noted that actual employment in the education sectors is probably higher than this number. The IMPLAN data indicate that in 2006 and 2009 Education Services employs over 21,000 and 19,000 workers, while Mining 361 and 412 workers, respectively. Therefore, the LQs for these two sectors calculated from the above-mentioned estimates are likely underestimated. The LQ results are summarized in Table 2.3.

Table 2.3: 2008 Location Quotients of Tompkins County Based on New York State

Major Industry	Tompkins County		New York State		Location Quotients
	Paid employees	% of Employment	Paid Employees	% of Employment	%TC/%NYS
Total for all sectors	46,947		7,617,164		
Agriculture	328	0.0070	3,328	0.0004	15.991
Mining	175 (C)	0.0037	4,678	0.0006	6.070
Utilities	416	0.0089	39,688	0.0052	1.701
Construction	1,069	0.0228	350,934	0.0461	0.494
Manufacturing	3,062	0.0652	511,209	0.0671	0.972
Wholesale trade	503	0.0107	394,390	0.0518	0.207
Retail trade	5,228	0.1114	892,335	0.1171	0.951
Transportation and warehousing	709	0.0151	240,237	0.0315	0.479
Information	783	0.0167	289,745	0.0380	0.438
Finance and insurance	1,067	0.0227	594,917	0.0781	0.291
Real estate and rental and leasing	687	0.0146	169,939	0.0223	0.656
Professional, scientific, and technical services	2,496	0.0532	582,925	0.0765	0.695
Company Management	453	0.0096	175,450	0.0230	0.419
Administrative and Support	644	0.0137	518,877	0.0681	0.201
Educational services	17,500 (J)	0.3728	361,429	0.0474	7.856
Health care and social assistance	5,100	0.1086	1,345,569	0.1766	0.615
Arts, entertainment, and recreation	392	0.0083	158,890	0.0209	0.400
Accommodation and food services	4,004	0.0853	626,195	0.0822	1.037
Other services (except public administration)	1,393	0.0297	355,505	0.0467	0.636

Note: C = 100 – 249 employees; J = 10,000 – 24,999 employees
Source: Author own calculation on data from 2008 County Business Pattern, U.S. Census Bureau

Industries with LQ more than 1.0 are Agriculture (15.991), Education Services (7.856), Mining (6.070), Utility (1.701), and Accommodation and Food Services (1.037). By definition, these sectors are considered basic for Tompkins County. Since this study focuses on tourism-related sectors I will further disaggregate the Accommodation and Food Services sector at the 3-digit NAIC level in order to see in more details whether the sub-sectors also have LQs greater than 1.0. At the 3-digit level, Accommodation and Food Services comprises two components, namely i) Accommodation, and ii) Food and Drinking Places.

I discover that Accommodation employs 684 people in Tompkins County and 92,656 in New York State. Additionally, Food and Drinking Places employs 3,320 and 533,539 people in Tompkins County and New York State, respectively. The LQ for Accommodation is thus 1.1978, while for Food and Drinking Places 1.0096. We may conclude that both Accommodation and Food and Drinking Places, with LQ marginally greater than 1, are sectors that produce the level of output that is just sufficient to meet local demand.

The economic base analysis using location quotients gives us some ideas what industries are considered economic drivers in the region. We then turn to explore the growth trends of individual sectors by looking at the change in employment between 2006 and 2009 using IMPLAN data. It should be noted that sectors in the LQ economic base analysis and in the following analysis are not identical since I have disaggregated tourism sectors in the IMPLAN data file to focus on tourism-related activities. Additionally, it can be observed that the employments figures from the County Business Pattern and IMPLAN data, even with differences in years taken into account, exhibit suspiciously large discrepancies – IMPLAN data indicate higher numbers of employment or employment proportions than the CBP. Nevertheless, the employment data provided by IMPLAN are useful in the analysis of sectoral growth and decline.

From the comparison of sectoral employments between the two years before and after the economic recession, only Mining and Food and Drinking Places show an upward trend in employments. Focusing on tourism-related sectors, we find that sectors with positive employment growth are Ground Passenger Transport, Food and Drinking Places and Automotive Rental whose employments increase by 8%, 45% and 56%, respectively. Although the percentage increase for Automotive Rental appears impressive, the actual increase is relatively small and the industry employs only about 26 workers in total. The details of sectoral employments in Tompkins County based on IMPLAN industrial classification are illustrated in table 2.4 as follows.

Table 2.4: Composition of Employments in Tompkins County (2006-2009)

Industry	2006		2009		Change	
	Employment	% of total	Employment	% of total	06-09	% change
Agriculture	1,648.08	2.00%	1,330.09	2.14%	(317.98)	-19%
Mining	361.12	0.44%	411.87	0.66%	50.75	14%
Utility	431.41	0.52%	287.22	0.46%	(144.20)	-33%
Construction	1,324.38	1.61%	1,548.74	2.49%	224.36	17%
Manufacturing	4,089.08	4.96%	2,957.43	4.76%	(1,131.65)	-28%
Wholesale Trade	472.39	0.57%	558.27	0.90%	85.88	18%
Retail Trade	4,233.18	5.14%	4,162.81	6.70%	(70.37)	-2%
Transportation	342.92	0.42%	318.62	0.51%	(24.30)	-7%
Information	544.18	0.66%	583.09	0.94%	38.91	7%
Finance and Insurance	1,124.72	1.37%	1,189.21	1.91%	64.49	6%
Real Estate	909.77	1.10%	993.83	1.60%	84.06	9%
Professional and Technical Services	2,785.60	3.38%	3,163.06	5.09%	377.46	14%
Company Management	45.21	0.05%	54.61	0.09%	9.40	21%

Table 2.4: Composition of Employments in Tompkins County (2006-2009) (Continued)

Industry	2006		2009		Change	
	Employment	% of total	Employment	% of total	06-09	% change
Administrative Services	751.47	0.91%	629.40	1.01%	(122.07)	-16%
Education Services	21,783.09	26.45%	19,713.00	31.73%	(2,070.09)	-10%
Healthcare	26,450.45	32.11%	6,386.95	10.28%	(20,063.50)	-76%
Other Services	2,684.93	3.26%	2,955.82	4.76%	270.89	10%
Public Administration	6,658.24	8.08%	7,141.01	11.50%	482.77	7%
Tourism-related Retails	932.40	1.13%	756.16	1.22%	(176.24)	-19%
Ground Passenger Transport	287.87	0.35%	311.28	0.50%	23.41	8%
Tourism-related Services	364.80	0.44%	342.46	0.55%	(22.34)	-6%
Automotive Rental	16.87	0.02%	26.27	0.04%	9.40	56%
Entertainment and Recreation	718.95	0.87%	663.19	1.07%	(55.75)	-8%
Hotels and Motels	413.61	0.50%	296.62	0.48%	(116.98)	-28%
Other Accommodations*	1,292.76	1.57%	1,239.30	2.00%	(53.46)	-4.14%
Food and Drinking Places	2,835.45	3.44%	4,099.20	6.60%	1,263.75	45%
Total	82,366.84		62,119.50		(20,247.34)	-25%

Source: IMPLAN data file for Tompkins County 2006 and 2009 with author own aggregation scheme

In terms of workforces, the top three largest industries are the same for 2006 and 2009, namely Education Services, Public Administration, and Healthcare. We also learn that the top three largest industries in terms of output in 2006 are Education Services, Manufacturing, and Real Estate respectively. In 2009 Healthcare became the second largest industry while Manufacturing dropped to third.

* The 2006 employments for Other Accommodations sector has been adjusted due to IMPLAN's re-definition of the sector to transfer activities involving dormitories, fraternities, and sororities from Education Services to Other Accommodation. The recalculation for estimated employment is explained in details in the following chapter.

2.3 Summary

From the preceding data, we can observe that Tompkins County seems to be shaped by the presence of the higher education institutions such as Cornell University and Ithaca College, as reflected in the high share of the educated and relatively low median age of the population.

Tompkins County's unemployment rates have been steadily low over the years. Even with the economic recession, the County's unemployment rate is the lowest in New York State. The economic base analysis reveals that the County's economy is dominated by a few major industries, namely Agriculture, Education Services and Mining. On the other hand, I find that per capita income as well as median household income is relatively low compared to the State and the national level, and this is reflected in the County's poverty rate that is approximately 5% higher than that for the State, which we believe partly stems from the high proportion of student population in the County. Another outstanding characteristic of Tompkins County's economy is the concentration of employment in three industries, namely Education Services, Healthcare, and Public Administration, whose employments altogether make up more than half of the total employment in the region. It may be worthwhile for policy makers to consider promoting prospective industries or business activities to diversify the economic base.

Chapter 3

Tourism in Tompkins County

The previous chapter examines Tompkins County's economy and found that there is evidence of "crowding out" economic activities in the County, where three main industries dominate regional employment. This crowding out phenomenon may have a role in the conflicting evidence of the county's low unemployment but high number of persons below the poverty level on top of a high proportion of student population in the region. The relatively high poverty suggests the needs for new business activities that have the potential to improve employees earning and income distribution. In Chapter 1, I also noted the concerted attempts among local communities and authorities to promote tourism activities in order to enhance economic development. This chapter will explore various aspects of tourism in Tompkins County and the related industries, which provide useful information for the County's administrators and policymakers who are interested in tourism promotion as an alternative development policy.

3.1 Visitors Profile

Tompkins County is anchored by the City of Ithaca where Cornell University and Ithaca College are situated. Each year these institutions of higher education draw a large number of visitors to the County for academic reason as well as for leisure and business. The County also possesses beautiful sceneries, outdoor activities, places of attractions as well as numerous festivities to offer to its visitors. In this section, we will examine the visitors' profile in 2009, the

period after the outburst of the economic recession, and then compare the industry's performance with that in 2006, before the recession hit the nation. This comparison is primarily based on the secondary data obtained from Tompkins County's visitors' profile and the 2006 and 2009 IMPLAN data files.

I obtained the County's visitors' profile from the research survey conducted by Chmura Economics and Analytics firm under the commission of Tompkins County Legislator's Strategic Tourism Planning Board and the Ithaca/Tompkins Conventions and Visitors Bureau. For this survey, the data are collected from various sources including the lodging establishment records, public statistics, field surveys, and in-person interviews. Three types of survey were conducted to ensure the accuracy and completeness of information, namely i) a visitor intercept survey done at various tourism sites with a total of 1,503 responses; ii) a random household survey with 223 responses; and iii) a student survey of Cornell and Ithaca College students with 101 responses. All these surveys were conducted between December 2008 to November 2009 in order to capture the year-round details related to visitors and the state of tourism in the County. For these surveys, visitors are defined as "those who do not live, work, or attend schools in the Tompkins County area," and the questions contained in them are mainly about characteristics of visitors, the purposes of their visits, the travel planning, activities and length of stay as well as the amount of spending.

The results show that, in 2009, there were approximately 843,135 visitors to Tompkins County with an average of 70,261 visitors per months. However, records show a strong seasonality whereby the highest volume appeared in July and August, accounting for 70% of the annual visitors. More than half of Tompkins County visitors are from within the New York State and only about 3% are from foreign countries (excluding Canada). Among visitors from New

York State, 55% visited the County for leisure and 37% are for a university-or-college-related purpose.

Among all visitors, around 33% stayed in local accommodations establishments, 19% stayed with family or friends (including on campus), 11% stay in other kinds of accommodations and 37% are day trippers. The estimated total number of visitors by types of stay is displayed in table 3.1.

Table 3.1: Estimated Total Visitors by Types of Stay in Tompkins County for 2009

Types of Accommodation	Number	Percent
Staying in Hotel/Motels/B&B	278,462	33%
Staying with Family and Friends (including on	161,898	19%
Other Lodging (Camping, Dorm, etc.)	88,795	11%
Day Tripper	313,980	37%
Total	843,135	100%

Source: Chmura Economics & Analytics

For the mode of transportation across all type of visitors, shown below in Figure 3.1, on average 91% of visitors to Tompkins County traveled by automobile, 10% arrived by air transportation, 2% by bus, and 1% by other mode of transportation. It should be noted that the total exceed 100% because respondents are allowed to select more than one mode of transportation; for example, those who arrives by air at other airport than the Tompkins Regional Airport and travel into the County by automobile. These statistics for visitors' type of stay and mode of transportation are crucial for sorting the visitor expenditure in corresponding tourism-related sectors for the impact analysis later on.

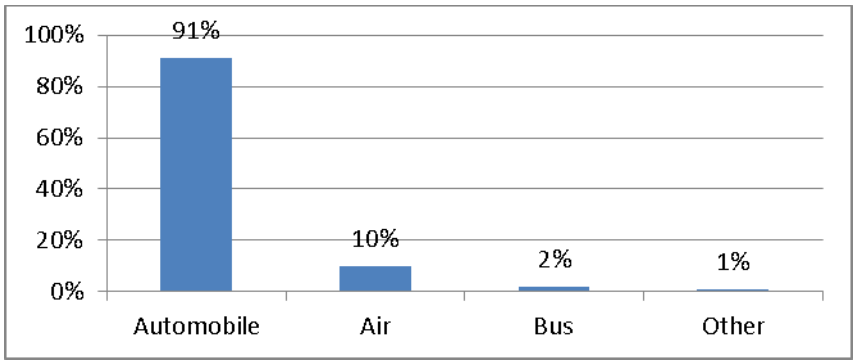


Figure 3.1: Modes of Transportation to Tompkins County for 2009

Tourist spending in Tompkins County for 2009 was approximately $185 per person per trip. This amount could be broken down to $65 on food and drink, $52 on lodging, and $47 on shopping. Other spending is estimated per visitor and includes $12 for transportation, $5 for entertainment & attractions, and $4 for other items. By the methods of which this tourists profile is obtained, it is assumed that these numbers are the spending of out-of-town visitors and do not include the spending of locals. With the average spending of $185 per person and the estimated number of visitors in Tompkins County in 2009 of 843,135, the total visitor spending would amount to almost $156 million. Table 3.2 displays the pattern of spending of tourist in Tompkins County in 2009 (average for all visitors).

Table 3.2: Average Spending per Visitor per Trip in Tompkins County

Type of Spending	Per Visitor	All Visitors	Percentage
Food & Drink	$65	$54,803,775	35%
Lodging	$52	$43,843,020	28%
Shopping	$47	$39,627,345	25%
Local Transportation	$12	$10,117,620	7%
Entertainment & Attractions	$5	$4,215,675	3%
Other	$4	$3,372,540	2%
Total	$185	$155,979,975	100%

Source: Adapted from Chumura Economics & Analytics

In order to conduct impact analysis, we need to break down the expenditures on lodging and local transportation to suit the tourism-related sectors in our Social Accounting Matrix model. For the lodging component, we look at the type of accommodations as shown in Table 3.1 and from this information we only take into account the number of visitors who stayed at lodging establishments and other accommodations, while excluding those staying with family and friends as well as the day trippers. We assume that the percentage of those staying in the hotels/motels/B&B is three times larger than those staying in other accommodations (camps, dorms etc.). Therefore, the total spending for the Hotel and motel industry is approximately 75% of total accommodation expenditure while other accommodation accounts for 25%.

As for the spending on local transportation, we must identify the proportion of those in automotive rental and public transportation categories. For this reason, we refer to the data on mode of transportation reported in the survey as illustrated by Figure 3.1. We assume that the majority of visitors arriving by automobile would not rely on local transportation and we only take into account those who arrive in the County by air, bus and other modes of transportation. Further assumption has been made that the majority of visitors who arrive by air tend to use rental vehicles, while those who arrive by bus or other modes tend to use public transit. For this reason, we assume that 80% of the expenditures on local transportation goes to the Automotive Rental sector while the other 20% goes to the Ground Passenger Transport sector. Based on the data from the survey findings and the above assumptions, visitor spending is categorized into eight tourism-related sectors corresponding to the SAM model used in this study. The visitors' pattern of spending is illustrated in Table 3.3.

Table 3.3: Tompkins County's Visitor Spending in Tourism-related Industry for 2009

Tourism-related Industry	Visitor Spending
Tourism-related Retails	$39,627,345
Ground Passenger Transport	$2,023,524
Tourism-related Services	$3,372,540
Automotive Rental	$8,094,096
Entertainment & Recreation	$4,215,675
Hotels and Motels	$32,882,265
Other Accommodations	$10,960,755
Food and Drinking Places	$54,803,775
Total	$155,979,975

3.2 Tourism Industry Change

The next step is to identify the tourism industry change by comparing visitor expenditures for 2009 and 2006, before the economic crisis occurs. Unfortunately, there is no such survey on tourism industry in Tompkins County for 2006, at least not at the same level of details for number of visitors or the spending pattern in that period. Thus I assume that the spending pattern of visitors coming into the County remains unchanged between 2006 and 2009. I then used the 2009 tourism spending to calculate the non-local-use ratios, which is the proportion of sales from tourism to the total output of related sectors from IMPLAN SAM. These ratios are then used to multiply the corresponding CPI adjusted industry output of 2006 in order to estimate tourism revenues generated in the eight tourism-related sectors. Table 3.4 illustrates the non-local-use ratios for Tompkins County in 2009. The calculated non-local use ratios are believed to reasonably reflect the proportion of visitor spending to those made by the locals. For example, in the Hotel and Motel sector, visitor spending accounted for a large proportion (74%) of the industry's total output while Food and Drinking Places or Entertainment and Recreation only account for less than 10% of their industry output, which is understandable

since the latter industries provide more services to the locals. As for Tourism-related Retail the ratio is considerably high, which is probably due to the aggregation scheme made in IMPLAN where only two related retails sectors are aggregated to represent tourist shopping expenditure visitors. The reason only two retail sectors are aggregated is to limit the aggregation errors. The two retail sectors are those for clothing, accessories, hobby, books, sporting goods, and music which I deem suitable for tourist shopping. The details of the tourism-related sectors and their aggregation scheme in the IMPLAN data file are further discussed in Chapter 5.

Table 3.4: Non-local-use Ratios of Tourism-related Industries for Tompkins County

Tourism-related Industry	Total Output 2009	Visitor Spending	Non-local-use Ratio
Tourism-related Retails	$66,614,977.02	$39,627,345.00	59%
Ground Passenger Transport	$32,177,285.22	$2,023,524.00	6%
Tourism-related Services	$62,908,525.01	$3,372,540.00	5%
Automotive Rental	$17,648,779.25	$8,094,096.00	46%
Entertainment & Recreation	$71,526,976.76	$4,215,675.00	6%
Hotels and Motels	$44,168,953.53	$32,882,265.00	74%
Other Accommodations	$132,207,864.75	$10,960,755.00	8%
Food and Drinking Places	$431,118,903.33	$54,803,775.00	13%
Total	$835,541,646.00	$155,979,975.00	19%

Before the calculations for 2006 visitor expenditures can be executed, the industries' outputs from the 2006 SAM need to be inflated to the 2009 value in order the capture the industry change for the impact simulation. However, I found that there is a large discrepancy in the outputs for "Other Accommodations" between the two periods. In 2006 "Other Accommodations" generated approximately $17 million in output but the number jumped to about $132 million in 2009. While contacting the Minnesota IMPLAN Group, which compiles the data used in this analysis, I was informed that the definition of "Other Accommodations" sector has been redefined to include fraternities, sororities and off-campus dormitories (Olsen,

2011). Both 2006 and 2009 data have this same definition but the outputs are calculated differently. The 2006 Other Accommodation output is calculated by increasing the previous year output by 5%, while at the same time Education Services is rendered a 5% decrease. Since Education Services is the largest sector in Tompkins County, the 5% decrease in its output creates a significant drop in the employment numbers. To preserve the County employment number, the calculation for 2009 is done by transferring 5% of Education output to "Other Accommodations," resulting in the large increase of its output.

With this information, the 2006 output for "Other Accommodation" is adjusted by the calculation method applied to those of 2009:

1. Take out 5% of Other Accommodations: 17,246,230.99 – 862,311.55 = 16,383,919.44
2. Add 5% to Education Services: 1,676,410,627*1.05 = 1,760,231,158.71
3. Calculate 5% of the new Education output: 1,760,231,158.71*0.05 = 88,011,557.94
4. Add the 5% from Education output to Other Accommodations: 16,383,919.44 + 88,011,557.94 = 104,395,477.38

Once the new level of Other Accommodation output comparable to that of 2009 is obtained, I made an inflation adjustment for the 2006 output with the 2009-to-2006 CPI ratio (U.S. city average – all items with 1999 base year) from the U.S. Bureau of Labor Statistics in order to have the data for both periods enumerated at the same price level. The CPI ratio of 2009 to 2006 is about 1.06. Finally, output changes for tourism-related sectors in Tompkins County between the period before and after the recession are obtained. Table 3.5 shows the calculated tourism output for 2006, while Table 3.6 gives the industry change between the two periods, which is also illustrated in Figure 3.2.

Table 3.5: Tourism-related Industries and Estimated Visitor Spending in 2006

Industry	Total Output (from IMPLAN)	Total Output (with definition readjustment)	CPI Adjusted	Non-local-use Ratio	Estimated Tourism Revenue
Tourism-related Retails	$ 87,721,454.49	$ 87,721,454.49	$ 92,857,283.24	59%	$ 55,238,142.58
Ground Passenger Transport	$ 33,856,293.15	$ 33,856,293.15	$ 35,838,477.83	6%	$ 2,253,764.40
Tourism-related Services	$ 133,988,522.98	$ 133,988,522.98	$ 141,833,150.18	5%	$ 7,603,706.69
Automotive Rental	$ 16,202,901.69	$ 16,202,901.69	$ 17,151,533.11	46%	$ 7,866,048.61
Entertainment and Recreation	$ 58,238,330.57	$ 58,238,330.57	$ 61,648,010.61	6%	$ 3,633,426.00
Hotels and Motels	$ 48,947,927.62	$ 48,947,927.62	$ 51,813,682.36	74%	$ 38,573,502.38
Other Accommodations	$ 17,246,230.99	$ 104,395,477.38	$ 110,507,520.29	8%	$ 9,161,677.77
Food and Drinking Places	$ 283,626,668.68	$ 283,626,668.68	$ 300,232,161.68	13%	$ 38,165,470.61
Total	$ 604,150,339.82	$ 691,298,144.28	$ 731,771,582.65		$ 160,186,008.63
			Tourism Revenue/Total Output = 22%		

Table 3.6: Tourism Industry Change (2006 – 2009)

Industry	2006	2009	Change	% Change
Tourism-related Retails	$ 55,238,142.58	$ 39,627,345.00	-15,599,629.64	-28%
Ground Passenger Transport	$ 2,253,764.40	$ 2,023,524.00	-230,407.03	-10%
Tourism-related Services	$ 7,603,706.69	$ 3,372,540.00	-1,890,576.51	-36%
Automotive Rental	$ 7,866,048.61	$ 8,094,096.00	228,046.23	3%
Entertainment and Recreation	$ 3,633,426.00	$ 4,215,675.00	561,162.66	15%
Hotels and Motels	$ 38,573,502.38	$ 32,882,265.00	-5,706,531.54	-15%
Other Accommodations	$ 9,161,677.77	$ 10,960,755.00	1,799,155.08	20%
Food and Drinking Places	$ 38,165,470.61	$ 54,803,775.00	16,632,747.13	44%
Total Change	$162,495,739.05	$155,979,975.00	-4,206,033.63	-2.6%

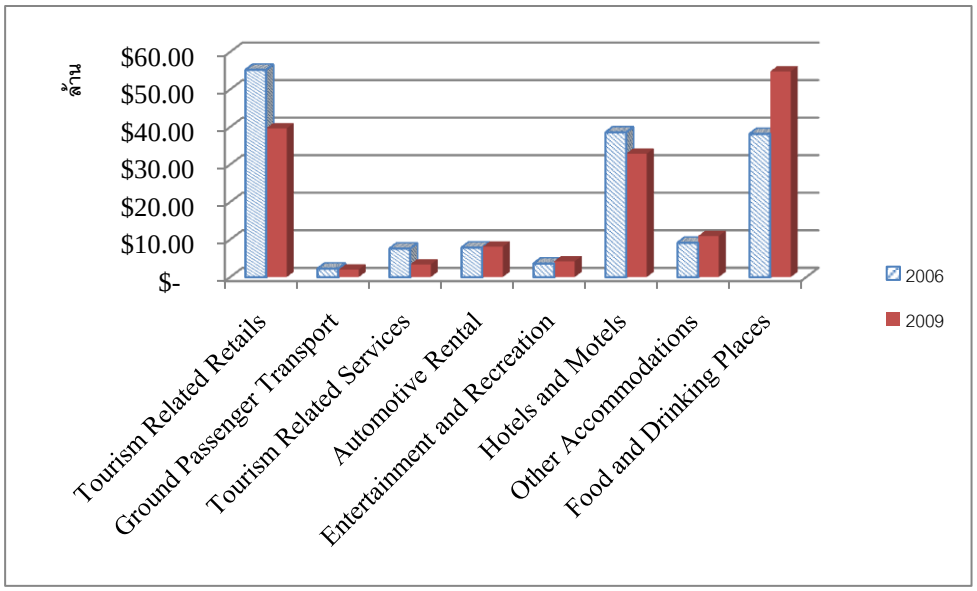


Figure 3.2: Visitor Spending in Tompkins County for 2006 and 2009 (in million dollars)

We can see that Tompkins County tourism suffers from the economic recession with the overall loss of tourism revenue of $4,206,033.63, or about 2.6% of the total output of eight tourism-related sectors. However, the industry breakdown (Table 3.6; Figure 3.2) reveals that not all sectors experienced a loss of income from tourist spending but in fact some sectors experienced positive growth in tourism revenues. These sectors are "Automotive Rental", "Entertainment and Recreation", "Other Accommodation", and "Food and Drinking Places," with the growth of 3%, 15%, 20%, and 44% respectively. On the other hand, sectors experiencing declines are "Ground Passenger Transport" (-10%), "Hotels and Motels" (-15%), "Tourism-related Retails" (-28%) and "Tourism-related Services" (-36%).

It should be noted here that because of the lack of better data on actual visitor expenditures in 2006 the estimated percentage changes may not portray the true magnitude of the change. But this information is useful in giving us some insights into the tourism trend in the context of the recession; for example, we see that "Hotels and Motels" lost its revenues from

tourism but “Other Accommodation” experienced a gain, suggesting that tourists prefer to save their accommodation expenditure and probably spend more for food or entertainment. We also observe a decline in “Ground Passenger Transport” while “Automotive Rental” had a marginal increase in revenues implying the preferred mode of transportation among visitors despite the economic recession. These estimated industry changes will be used in the impact analysis in the following chapters.

Chapter 4

Social Accounting Matrix and Structural Path Analysis

4.1 The Social Accounting Matrix (SAM) Framework

Tourism has been viewed as an effective mean for regional economic development and with this reason many government agencies have implemented tourism promotion policies to revive economic vitality especially to gain more income and employment in the economy. There are numerous studies on the economic impact of travel and tourism in the literature and the most frequently-used quantitative method is perhaps the input-output (I-O) model developed by Dr. Wassily Loentief in the 1930s. The I-O model is a powerful tool for the analysis of the interdependency of industries generated through backward and forward linkages. I-O framework has been extensively used in economic studies and there are many extensions to the basic model for the more detailed analysis of the economy (Miller and Blair 2009).

One of the widely known extensions of input-output model is the Social Accounting Matrix (SAM) which extends the I-O basis on the inter-industries' distributions of products to capture more comprehensively the structure of an economy. Underlying a SAM is the System of National Accounts (SNA) – an international standard set of macroeconomic statistics displaying "how income originating in production, modified by taxes and transfers, flows to these groups and how they allocate these flows to consumption, saving and investment" (United Nations Statistics Division 2011). The SAM records economic transactions in the product and factor markets as well as the transfers between institutions such as governments, corporations and households. There are numerous discussions on the construction of SAM and its application for

policy analysis (such as Pyatt and Round 1977, 1979, 1985; Adelman and Robinson 1986; Round 2003). Round (2003) identifies three unique features of SAM. First, it is represented by a square matrix where each account is represented in corresponding row and column. Each cell in the SAM matrix shows the transactions between them. Second, it depicts an easy-to-understand and comprehensive picture of economic activities in the study area. Finally, SAM is highly flexible in the level of aggregation or disaggregation which allows the study to focus on specific topics for the analysis.

In general, a SAM records the transactions between economic actors within a period of one year, capturing the interdependency among production activities, production factors and institutions. Round (2003) asserts that "the overriding feature of a SAM is that households and household groups are at the heart of the framework; only if some detail exists on the distributional features of the household sector can the framework truly earn the label social accounting matrix".

The SAM model works under the assumptions of excess resource capacity, homogenous sectoral output, and fixed prices. These assumptions along with the SAM's static framework make it more suitable for a short-run analysis especially in examining the impact from an economic shock by means of multiplier effects. For the impact analysis, the SAM is divided into two separate classes of accounts – endogenous and exogenous accounts. The endogenous accounts usually comprises production activities; factors of production such as labor and capital; and institution such as corporations and households. The exogenous accounts typically include the government; capital; and rest of the world. The transactions among endogenous and exogenous accounts in SAM are illustrated by a diagram of the income and expenditure flow in an economy as in Illustration 4.1.

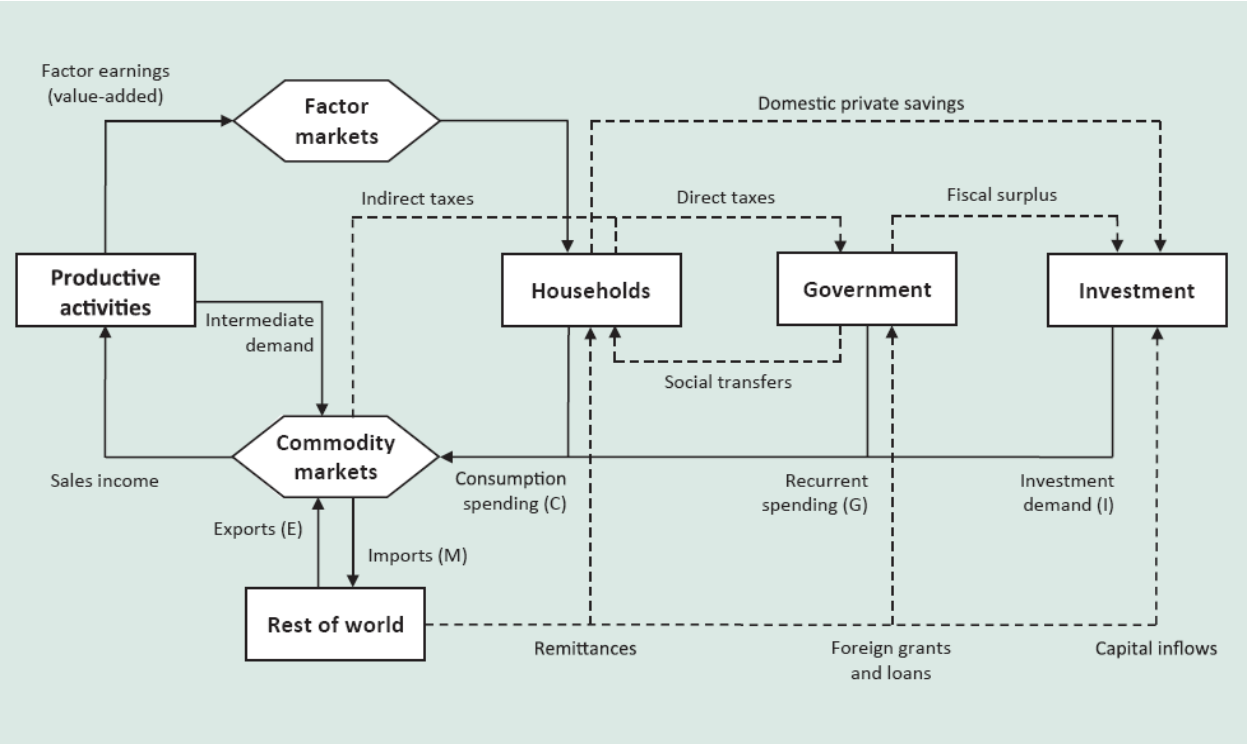


Illustration 4.1: Income and Expenditure Flow in an Economy
Source: Breisinger, C., M. Thomas, and J. Thurlow, 2009.

The diagram in Illustration 4.1 shows the circular flow of income and expenditure in which the boxes represent the accounts in a SAM while the arrows show the direction of payments. For example, the expenditures of production activities flow into factor markets generating income for households who own factors. Households spend their income in commodity markets for consumption, which in turn generates revenues for industries in the production account. The SAM captures these transfers and presents them in a matrix form where each row and column represents the income and expenditure of the corresponding account. The payments of each account flow from the column perspective into the receiving accounts in the row perspective. The SAM matrix can be constructed in different styles but with rows and columns in the same order and often times the exogenous accounts are aggregated into a single

account to represent the sources of injections and leakages. Table 4.1 gives an example of this simple SAM structure.

Table 4.1: Basic Structure of the Social Accounting Matrix

				Expenditures				
				Endogenous Accounts			Exogenous Accounts	Total
				Production	Factors	Households	Other Accounts	
				1	2	3	4	5
Receipts	Endo. Accounts	Production	1	z_{11}	0	z_{13}	x_1	y_1
		Factors	2	z_{21}	0	0		y_2
		Households	3	0	z_{32}	z_{33}	x_2	y_3
	Exog. Accounts	Other Accounts	4	l_1		l_3	t	y_x
		Total	5	y_1	Y_2	y_3	y_x	

Source: Adapted from Defourny and Thorbecke, 1984

Each sub-matrix of this generic SAM can be interpreted as the following:

z_{11} = the intermediate input requirement among production activities.

z_{13} = households consumption of the produced goods from each industries.

z_{21} = factors requirements of each production activity.

z_{23} = the distribution of factor income to household groups.

z_{33} = the income transfer between the household groups.

x_1 = final demand of goods and services from rest of the world (exports)

x_2 = household income generated overseas such as foreign remittance and government transfers.

l_1 = import payments.

l_2 = private saving and direct taxes.

Each cell in a SAM matrix, z_{ij}, tells us the expenditure of the account in column j paid to the receiving account in row i. Following accounting conventions, the row sum must equal to the corresponding column sum; in other words, total revenues of, for example, the account in row 1 must be equal to the total expenditures represented in column 1.

4.2 The SAM Multipliers

Like an input-output framework, a SAM-based economic impact analysis works through a multiplier approach in which multipliers are calculated by means of Loentief's inverse. The first step is to determine the endogenous and exogenous accounts. The exogenous accounts are excluded from the calculation of multipliers otherwise the matrix is not invertible due to Walras' Law. We have indicated earlier that government, capital, and rest of the world are often rendered exogenous because their transactions are not domestically determined. Then each transaction in the endogenous matrix Z is divided by the column sum to create a matrix of technical coefficients A. The matrices Z and A have the same partitions of sub-matrices. From our example in table 4.1, the partitions would be as the following:

$$A = \begin{bmatrix} A_{11} & 0 & A_{13} \\ A_{21} & 0 & 0 \\ 0 & A_{32} & A_{33} \end{bmatrix}$$

The sub-matrix A_{11} contains the input-output coefficients; A_{13} is the sub-matrix of household consumption coefficients; A_{21} is the factor demand sub-matrix; A_{32} is the sub-matrix of factor input coefficients; and A_{33} is the sub-matrix of household transfer coefficients. From this we get:

$$Z = Ay \qquad (1)$$

$$y = Ay + x = (I - A)^{-1} = M_A x \qquad (2)$$

where x and y are vectors of injection and account total respectively; I is an identity matrix with the same dimension as the A matrix; and M_A is the matrix of SAM multipliers.

A SAM multiplier can be decomposed into i) the direct effect of an exogenous injection; ii) the indirect effect of the other sectors' increased demand for inputs necessary to produce more output required by the first sector; and iii) the induced effect of increased household consumption as a result of higher income from factors of production employed by industries to produce more output. The multipliers determine the equilibrium outcome of the total output y as a result of an injection x. Each cell in a multiplier matrix, m_{ij}, can be interpreted as the total, additional demand for output of sector i brought about by a dollar of injection into sector j (Dietzenbacher 2010).

The SAM output multipliers can also be used to measure the strength of backward linkages, which is the degree to which a producer relies on inputs from other sectors to produce its output. Backward linkages are identified as the column sum of the total requirement matrix or the matrix of output multipliers, $M = [m_{ij}]$ (Miller and Blair 2009; Dietzenbacher 2010). For example, the strength of the backward linkage for sector j is:

$$BL_j = \sum_{i=1}^{n} m_{ij}$$

4.3 The Exogenous Economic Shocks

The SAM describes an economy in equilibrium state and the SAM multipliers tell us the extent of the change when the equilibrium is disturbed by an exogenous shock. Normally the exogenous shock is the change in final demands originating in the exogenous sectors. What

constitute exogenous sectors depends on the researcher's choice of model closure. In an I-O model, it is common to see households, government, capital and rest of the world transactions being rendered exogenous, leaving only the inter-industry sub-matrix endogenous. In this case, the source of the exogenous shock can be a change in the consumption of households, government or private investments, or exports. However, in SAM models households are endogenous in order to capture more fully the powerful feedbacks from household consumption and income generation. Therefore, the source of the exogenous shock in a SAM model is either the government, capital account, or the rest of the world.

In analyzing the economic impact of tourism, the origin of the economic shock is often the change in final demand due to visitor spending or the sales of goods and services to non-local firms and households; in other words exports to rest of the world. Other economic shocks may originate in government expenditures as well as in investments on tourism-related activities and facilities.

4.4 Justification of the SAM Model

The SAM framework retains many of the features of an I-O model, including i) being demand driven without capacity constraints; ii) linear production function with constant returns to scale coefficients; iii) and fixed prices. These features can lead to an over-estimation of the economic impact of an exogenous shock because it does not take into account the possibilities of input substitution, externality effects or opportunity costs. However, SAM-based models are widely used for tourism impact analysis because they offer a number of advantages:

1) It is a general equilibrium model that provides a comprehensive and easy-to-understand picture of an economy capturing the economic interdependencies among various accounts and institutions within a region.

2) As a macroeconomic model, SAM can be used to quantify the region-wide impact of an economic shock. Such model shows how an economy in one equilibrium state moves to a new equilibrium in a comparative static sense after a disruption. Further, the impact can be easily decomposed into the direct, indirect, and induced effects.

3) The SAM is flexible with regards to the model closure, and it can be aggregated or disaggregated depending on the research objectives and data availability. This feature allows researchers to focus on specific topic or area of the analysis. For example, in tourism impact analysis the tourism-related industries are usually disaggregated while other, non-relevant sectors may be aggregated to reduce the model to a manageable size.

4) The SAM model's closure with respect to households is useful in studying the income distribution among different household groups. This feature of SAM makes it more realistic for an economic impact analysis than the basic I-O model.

These attributes make a SAM-based model a useful tool for economic impact analysis especially a *short-run* scenario, which would relax some limitations posted by above-mentioned assumptions. Nevertheless, SAM is often criticized for its enormous data requirements and constructing a SAM can be costly and time consuming. Though many national governments have provided national SAMs for their respective countries, sub-national or regional SAMs are still lacking in most countries. For the United States, the SAMs at the county level can be purchased from the Minnesota IMPLAN Group (MIG).

4.5 Structural Path Analysis (SPA)

The SAM model allows us to study the impact of a change in one sector on another sector through the size of the multipliers. But the SAM multipliers alone do not tell us how the impact is carried from an origin to the destination sector. To see the transmission path of the impact, we need to perform a Structural Path Analysis (SPA), a framework proposed by Defourny and Thorbecke (1984). The basic idea of a SPA is that the influence of the impact, i.e. the monetary flow, travels from one node to another along the transmission path. The influence can be categorized into direct influence, total influence and global influence.

4.5.1 Direct Influence

The direct influence is the income change of sector *j* which results from one unit change in sector *i* while holding other sectors not on the elementary path unchanged. Figure 4.1 show an elementary path between two poles, the origin pole *i* and the destination pole *j*, where the impact of an injection into *i* on *j* is transmitted along the elementary path of arc (*i, j*).

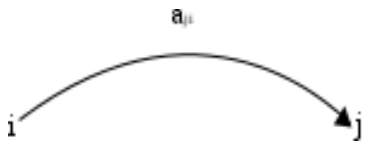


Figure 4.1: An Elementary Path along Arc (*i, j*).

$$I^{D}_{(i \rightarrow j)} = a_{ji}$$

where a_{ji} is the direct influence along the arc *(i, j)*.

For the elementary path with intermediate connecting poles, as displayed in Figure 4.2, the direct influence is the product of the intensities of each arc along the path (p).

Figure 4.2: Elementary Path along Arc (i, j) with Four Poles.

$$I^{D}_{(i \rightarrow j)p} = I^{D}_{(i,x,y,j)} = a_{x,i} a_{y,x} a_{j,y}$$

Where $a_{x,i}$; $a_{y,x}$; $a_{j,y}$ are the intensities along each arc along two connecting poles.

4.5.2 Total Influence

Usually when the impact is transmitted from one pole to another, apart from the direct transmission along an elementary path there are additional interactions with adjacent poles, creating a circuit of indirect influence as illustrated in Figure 4.3. The direct influence fuses with the indirect influence from adjacent circuits to create total influence, defined as the product of the direct influence and the path multiplier.

$$I^{T}_{(i \rightarrow j)p} = I^{D}_{(i \rightarrow j)p} M_p$$

where the path multiplier M_p is the effect of the adjacent feedback circuits.

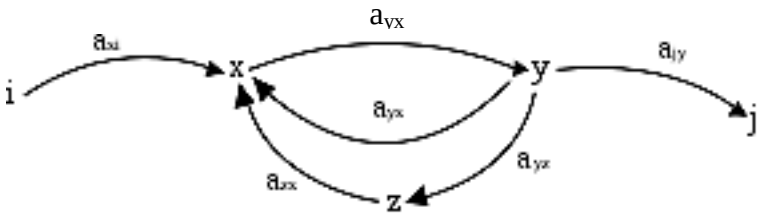


Figure 4.3: Elementary Path and Adjacent Circuits.

4.5.3 Global Influence

The global influence captures all the influences travelling between two poles, incorporating the entire set of total influences transmitted along all the available elementary paths connecting the origin and the destination. Thus, the global influence is the SAM multiplier itself, which encapsulate the full effects of an injection into pole *i* on the output of pole *j*. The matrix of SAM multipliers therefore can be considered the matrix of global influences. Figure 4.4 illustrates the network of elementary paths connecting pole *i* to *j*.

The global influence is given by:

$$I^{G}_{(i \rightarrow j)} = m_{a_{ji}} = \sum_{p=1}^{n} I^{T}_{(i \rightarrow j)p} = \sum_{p=n}^{n} I^{D}_{(i \rightarrow j)p} \; M_p$$

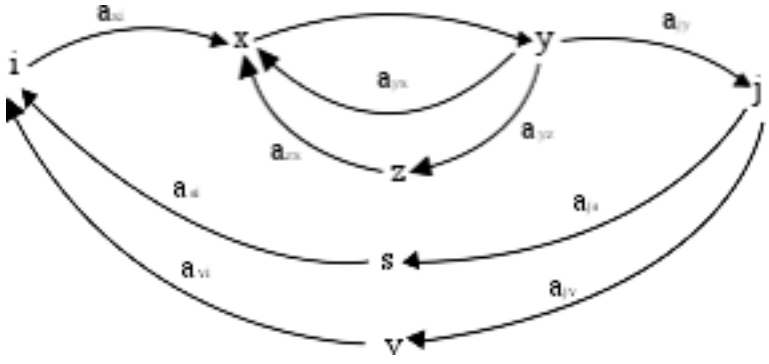


Figure 4.4: Network of Elementary Paths and Adjacent Circuits between Pole *i* and *j*.

Defourny and Thorbecke (1984) note that the scale of a path analysis can be large; for example, a simple six-sector input-output table can have up to 844 elementary paths. They suggest limiting the analysis to only the paths with arc lengths not more than three (as figures 4.2 – 4.5 illustrate), and which paths to be explored should depend on the questions. The merit of Structural Path Analysis (SPA) is that it provides insights on how an impact is carried from one sector to another in addition to the magnitude of the impact as measured by the multipliers. Moreover, SPA can identify potential bottlenecks or effective conveyors of the impact which are useful information for decision makers trying to identify the paths of least resistance.

An example might help explain the concept of Structural Path Analysis better. Table 4.2 provides two examples from Tompkins County's economy. The first example is a transmission of impact from Tourism-related Services sector (TRSSV) to Households with annual income of $50 - $75 thousands (HHMMM); while the second is from Wholesale Trades (WHOL) to Retail Trades (RETRD). For the first pair, the global effect or the SAM multiplier is 0.134, meaning that one dollar of injection into Tourism-related Services in the new equilibrium will generate $0.134 for Households $50 - $75K. The majority of the impact (40.8%) is transmitted from the origin – Tourism-related Services – through Employee Compensation (EMCOM) to the destination sector – Households $50 - $75K. The second most-important path, in which the impact is transmitted through Proprietary and Other Property Type Income (PRINC), has the same number of poles but a smaller path multiplier. This suggests that although the total impact transmitted through the second path is smaller, with 25.9% contribution to the global effect as oppose to 40.8% in the first path, it will take less time for the impact to be realized because the path multiplier is larger. The third-ranked path for this pair has four transmission poles, and the

more poles result in a larger path multiplier. The impact transmitted through a path with larger path multiplier is expected to take longer time to reach the destination.

Table 4.2: Examples of Structural Path Analysis for Tompkins County Economy.

Path	Global Effect	Direct Effect	Path Mult	Total Effect	% of Global	Cum %
1. TRSSV > EMCOM > HHMMM	0.134	0.025	2.197	0.055	40.8	40.8
2. TRSSV > PRINC > HHMMM		0.017	2.079	0.035	25.9	66.7
3. TRSSV > PUBAD > EMCOM > HHMMM		0.004	4.163	0.016	11.7	78.3
1. WHOL > RETRD	0.08	0.002	4.095	0.009	11.5	11.5
2. WHOL > EMCOM > HHMM > RETRD		0.002	4.608	0.007	8.8	20.3
3. WHOL > EMCOM > HHMMM > RETRD		0.003	4.644	0.012	14.9	35.2
4. WHOL > EMCOM > HHR > RETRD		0.001	4.616	0.006	7.1	42.3
5. WHOL > EMCOM > HHRR > RETRD		0.001	4.63	0.006	8	50.3

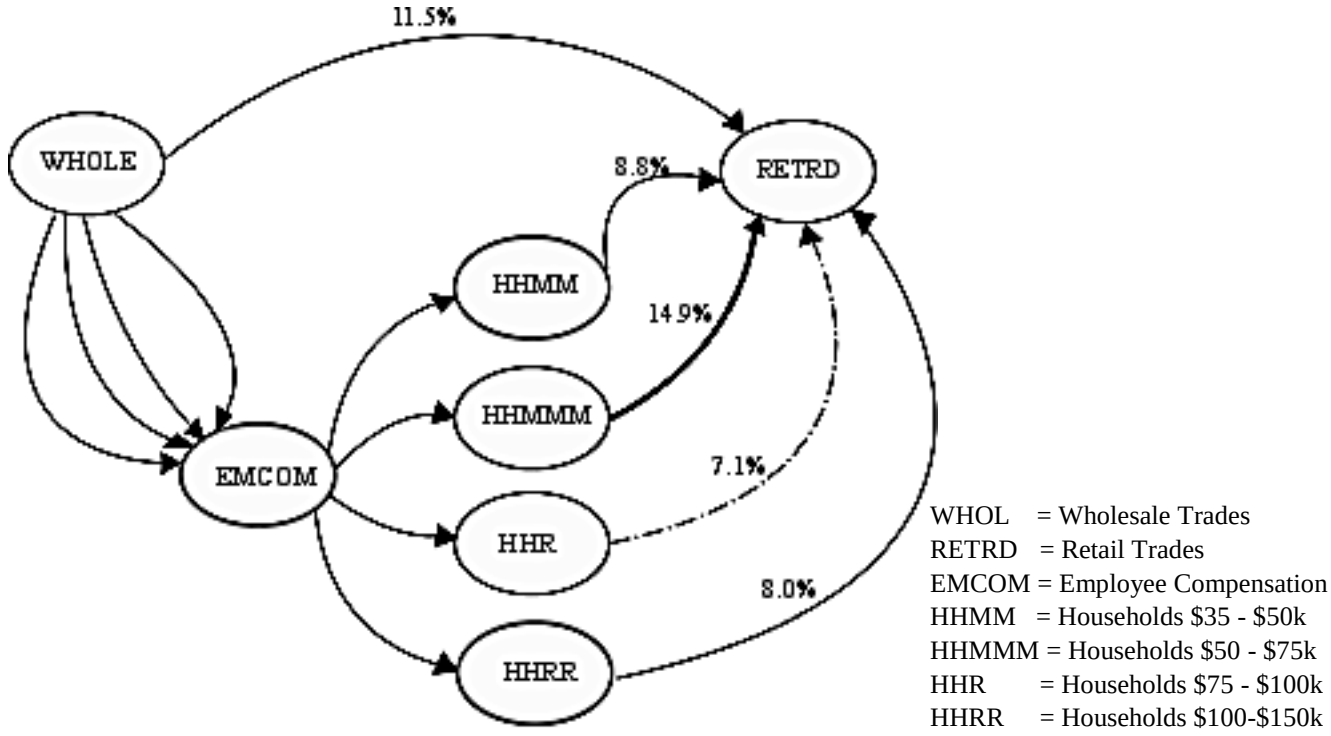


Figure 4.5: Impact Transmission Paths from Wholesale Trades to Retail Trades.

The second example, portrayed in Figure 4.5, presents an interesting result. Intuitively we expect an impact from Wholesale Trades to be transmitted directly to Retail Trades because of the latter's input requirements. However, the SPA tells us that the direct transmission has a smaller contribution to the global effect than the impact mediated through Employee Compensation and Households $50 – $75K. It appears that Households $50 – $75K are an effective conveyor of impact between Wholesale Trades and Retail Trades. On the other hand, when the impact goes through other types of households, the total impact is smaller. Of the five paths shown, the one that goes through Households $75 - $100k incomes (HHR) has the smallest total effect, contributing 7.1% to the global effect. We can thus conclude that Households $75 - $100 incomes are a bottleneck in this case, if the households are expected to be an important mediator between Wholesale and Retail Trade.

The Structural Path Analysis is a valuable tool that complements the economic impact analysis model since it provides a more complete picture. The additional information concerning the bottlenecks or effective impact conveyors can help decision makers make policy choices as well as make the right calls to improve the efficiency of any investment or to dampen the negative impact on specific sectors. The SPA is most often used in multiplier analyses that focus on environmental sustainability (Lenzen 2003), technology choices (Thorbecke 1989), and rural economics analysis (Roberts 2005).

Chapter 5

Model Simulations and Results

My objective in this study is to find out the impact of tourism industry change on the economy of Tompkins County, in particular the loss of tourism income from economic fluctuations in a recession. This study focuses on the relationship between tourism impact on households' income and its distributive effect. To achieve these objectives, I have obtained data on tourism expenditures for two periods, before and after the occurrence of a recent recession, as well as the multipliers from Social Accounting Matrix for Tompkins County. The impact analysis is performed under the SAM-based model, and different scenarios are simulated to gain deeper insights of tourism impact on households in the region.

5.1 The Data

The two types of data required for the economic impact analysis are i) the exogenous shock and ii) the SAM multipliers.

5.1.1 The exogenous shock: tourism industry change

This study simulates the impact of the change in tourism final demands between 2006 and 2009. The tourism final demand change is defined as the difference in the level of visitor expenditures on tourism-related activities in Tompkins County. The economic model used in this study is built on IMPLAN's SAM for 2006 which comprises 509 industries corresponding to 2002 North American Industry Classification System (NAICS). I aggregated the original 509 industries to 26 to reduce the size of the model and to simplify the analysis. Industries considered

tourism-related are either left disaggregated or minimally aggregated to avoid aggregation errors. The eight tourism-related industries in this study and their aggregation scheme are shown in Table 5.1.

Table 5.1: Tourism-Related Industries and Their Aggregation Scheme

Tourism-related Industries	Aggregation Scheme
Tourism-related Retails	408 Clothing and clothing accessories stores 409 Sporting goods - hobby - book and music stores
Ground Passenger Transport	395 Ground Passenger Transport
Tourism-related Services	326 Gasoline Station 338 Scenic and sightseeing transportation and support services 383 Travel Arrangement and Related Services
Automotive Rental	432 Automotive Rental and Leasing
Entertainment and Recreation	471 Performing arts companies 472 Spectator sports 473 Independent artists- writers- and performers 474 Promoters of performing arts and sports 475 Museums- historical sites- zoos- and parks 476 Fitness and recreational sports centers 477 Bowling centers 478 Other amusement- gambling- and recreation industries
Hotels and Motels	479 Hotels and Motels
Other Accommodations	480 Other Accommodations
Food and Drinking Places	481 Food and Drinking Places

The 2009 data on visitor expenditures in Tompkins County are obtained from the Chmura Economic and Analytics Company survey commissioned by Tompkins County Legislator's Strategic Tourism Planning Board and the Ithaca/Tompkins Conventions and Visitors Bureau. Visitor expenditures for 2006, because of the lack of readily available data, are calculated using non-local-use ratios. These ratios are used to estimate tourism income in 2006 as described

earlier in Chapter 3. Table 5.2 summarizes and illustrates the industry change which will be used as the sources of exogenous shocks in my impact simulations.

Table 5.2: Estimated Tourism Industry Change 2006 – 2009 (dollars).

Industry	Tourism 2006	Tourism 2009	tourism change
Tourism-related Retails	55,226,974.64	39,627,345.00	-15,599,629.64
Ground Passenger Transport	2,253,931.03	2,023,524.00	-230,407.03
Tourism-related Services	5,263,116.51	3,372,540.00	-1,890,576.51
Automotive Rental	7,866,049.77	8,094,096.00	228,046.23
Entertainment and Recreation	3,654,512.34	4,215,675.00	561,162.66
Hotels and Motels	38,588,796.54	32,882,265.00	-5,706,531.54
Other Accommodations	9,161,599.92	10,960,755.00	1,799,155.08
Food and Drinking Places	38,171,027.87	54,803,775.00	16,632,747.13
Total	160,186,008.63	155,979,975.00	-4,206,033.63

5.1.2 The SAM multipliers

This study focuses on the impact of the tourism industry in terms of output and the SAM multipliers mentioned are strictly output multipliers, which are the Loentief inverse matrix calculated in Microsoft Excel using the 2006 IMPLAN SAM. There are total 37 accounts in the SAM, consisting of 26 production activities including eight tourism-related sectors; two value-added accounts – Employee Compensation and Proprietary and Other Property Type Income; and nine household groups. The SAM multipliers range between 2.2201 and 1.0005. The industry with the highest multiplier in Tompkins County is Finance and Insurance (2.2201), while the one with the lowest multiplier is Mining (1.0005). The matrix of SAM multipliers also reveals that, among all accounts, the top three sectors with the highest backward linkages is Automotive Rental, followed by Public Administration and Company Management. This means

that these sectors have the highest input requirements provided by the rest of the Tompkins County economy. To be more specific, the same one dollar of injection would generate the highest additional dollars in Automotive Rental due to its backward linkages, followed by Public Administration, and Company Management. Table 5.3 summarizes the SAM multipliers and their backward linkages for 2006 Tompkins County Economy.

Table 5.3: SAM multipliers for 2006 Tompkins County

Sectors	SAM Multipliers	Multiplier Rank	Backward Linkage	BL Rank
Agriculture	1.6878	19	4.0063	19
Mining	1.0005	37	2.9339	35
Utility	1.4380	21	3.4184	25
Construction	2.0043	8	4.4272	5
Manufacturing	2.1744	2	3.6432	22
Wholesale Trade	1.9638	11	4.0985	16
Retail Trade	2.0857	4	4.2295	13
Transportation	1.9252	14	4.2882	11
Information	1.9087	16	3.9833	20
Finance and Insurance	2.2201	1	4.3942	7
Real Estate	2.0827	5	4.0648	17
Professional and Technical Services	2.1726	3	4.5435	4
Company Management	1.9415	13	4.6836	3
Administrative Services	1.9730	10	4.4123	6
Education Services	1.0734	26	3.7912	21
Healthcare	1.3740	22	3.4635	23
Other Services	2.0053	7	4.3784	8
Public Administration	1.9115	15	4.8757	2
Tourism-related Retails	1.8662	18	4.0202	18
Ground Passenger Transport	1.5351	20	4.3265	10
Tourism-related Services	1.8757	17	4.2476	12
Automotive Rental	1.1932	23	5.2083	1
Entertainment and Recreation	2.0267	6	4.1429	15
Hotels and Motels	1.9848	9	4.3505	9
Other Accommodations	1.1687	24	3.4061	26
Food and Drinking Places	1.9549	12	4.1561	14
Employee Compensation	1.1519	25	3.2092	29

Table 5.3: SAM multipliers for 2006 Tompkins County (Continued)

Sectors	SAM Multipliers	Multiplier Rank	Backward Linkage	BL Rank
Proprietary + Other Property Type Income	1.0662	27	2.3192	37
Households LT10k	1.0036	36	2.9282	36
Households 10-15k	1.0058	35	3.3797	27
Households 15-25k	1.0166	34	3.0967	31
Households 25-35k	1.0189	33	3.1555	30
Households 35-50k	1.0351	31	2.9397	33
Households 50-75k	1.062	28	2.9732	32
Households 75-100k	1.0356	30	2.934	34
Households 100-150k	1.0418	29	3.4388	24
Households 150k+	1.032	32	3.3226	28

We also examine the multipliers of tourism-related industries representing these industries' impacts on households. The following are the ranks of multipliers among all 26 industries, ordered from highest to lowest. As it turns out, the ranking is the same across all types of households: 1) Ground Passenger Transport (4^{th}); 2) Hotels and Motels (11^{th}); 3) Automotive Rental (12^{th}); 4) Tourism-related Services (15^{th}); 5) Tourism-related Retails (17^{th}); 6) Food and Drinking Places (20^{th}); 7) Entertainment and Recreations (22^{nd}); and 8) Other Accommodation (26^{th}). The ranking tells us that if a tourist spends one dollar in each and every tourism-related sector in Tompkins County, the expenses on ground passenger transport, such as taxi or bus fares, would generate the highest additional income for households. This concept holds true for other tourism-related sectors, down to the one with the lowest multiplier, which is Other Accommodation.

At first, it may seem counter-intuitive that Other Accommodation is the sector creating the lowest impact on households compared to other tourism sectors. We would imagine that Other Accommodation comprises small inns, Bed and Breakfasts, or homestays run by private owners, which are expected to generate relatively more income to households than Ground

Passenger Transport which does not have direct link to households' income. However, we are dealing with a general equilibrium system in which impacts are amplified through many rounds of exchanges across all sectors in the entire economy. It appears that an additional one dollar's worth of demand for Ground Passenger Transport generates relatively higher output in other sectors than a one dollar's worth of new demand for Other Accommodation, and this in turn induces higher impact on households' income. The matrices of SAM multipliers for Tompkins County can be found in Appendix A.

5.2 The Economic Model Simulations

Different types of industry change are injected into the model to gain deeper understanding on the influence of tourism on households' earnings and income distribution in the region. The effects on households are compared with the initial earned income for each type of households. The household earned incomes are from the employment of factors of production, which include Employee Compensation and Proprietary and Other Property Income. The details of household earned income for each group are given in table 5.4.

Table 5.4: Household earned income

Household Group	Employee Compensation	Proprietary and Other Property Type Income	HH Earned Income
Households LT10k	23,186,532.00	5,501,238.27	28,687,770.27
Households 10-15k	38,641,011.00	9,390,178.00	48,031,189.00
Households 15-25k	113,257,800.00	27,828,545.00	141,086,345.00
Households 25-35k	140,915,590.00	34,763,191.50	175,678,781.50
Households 35-50k	254,671,380.00	62,846,341.00	317,517,721.00
Households 50-75k	490,945,470.00	121,117,092.00	612,062,562.00
Households 75-100k	264,151,710.00	64,307,124.00	328,458,834.00
Households 100-150k	307,587,800.00	71,162,802.00	378,750,602.00
Households 150k+	201,482,730.00	40,553,547.00	242,036,277.00

The models being simulated are as the followings:

Model 1: The tourism industry change between 2006 and 2009 is introduced into the corresponding tourism-related sectors.

Model 2: Only the negative changes of tourism industry output between year 2006 and 2009 are injected into corresponding sectors.

Model 3: the negative values of 2009 visitor expenditures are injected into corresponding sectors to see the impact of the hypothetical loss of all tourism activities in the region.

Model 4: The loss of 2009 tourism income is introduced as a loss in household earned income. The negative changes in tourism income is divided proportionately between Employee Compensation (69%) and Proprietary and Other Property Type Income (31%), and then injected into these two accounts. The objective of this model is to examine the impact of losses in tourism income on household earnings.

Model 5: The 10% reduction across all sectors' output is simulated. This is based on the assumption that the loss of tourism final demands also resulted in the decline of tourism inputs requirements on top of the decreased household income.

Model 7: The loss of tourism income is directly injected into each type of households according to the proportion of income levels.

Model 8: The loss of tourism income is equally distributed and injected across all types of households.

Although according to the SAM framework it is unlikely that households directly experience the loss of tourism income as simulated in Model 7 and 8, it will be interesting to see the impacts in terms of the magnitude as well as the distributive effects on different household groups.

5.3 The results

Simulation results, presented in Table 5.5, show the impacts of exogenous shocks on each type of household as a percentage of 2006 earned income. The first two models yield small impacts of less than 1% decrease in household earned incomes. Model three leads to an estimated loss of over 3% of household incomes. On the other hand, when households are assumed to experience direct income loss, model 4 suggests that households lose over 5% of their earned income. In model 5, the 10% decline in tourism input requirements across all sectors leads to a household income loss of approximately 0.75%. When we combine the loss of household income with a 10% decline in tourism input requirement, as in model 6, the impact on households is a fall of over 6% of earned incomes. In models 7 and 8, the tourism income loss is injected directly into household accounts. The shock is divided proportionately according to households' level of income in model 7, while it is evenly distributed in model 8. Model 7 results in over 8% decrease of households' earned income. By contrast, model 8 sees different degrees of impact on each household group. The model suggests that the most affected households are the lowest income group (-60%), followed by the second lowest (-36%) and the third lowest income household groups (-12%). The middle income and high income households appear to be much less affected by the negative injection in this model.

Table 5.5: Simulations Results

HH Group	HH Earned Income	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Households LT10k	28,687,770	-0.12844%	-0.5109%	-3.2809%	-5.5024%	-0.7505%	-6.252883%	-8.6077%	-60.4%
Households 10-15k	48,031,189	-0.12882%	-0.5112%	-3.2827%	-5.5008%	-0.7509%	-6.251667%	-8.6020%	-36.1%
Households 15-25k	141,086,345	-0.12902%	-0.5113%	-3.2840%	-5.5007%	-0.7512%	-6.251936%	-8.6005%	-12.3%
Households 25-35k	175,678,782	-0.12911%	-0.5115%	-3.2849%	-5.5015%	-0.7514%	-6.252881%	-8.6012%	-9.9%
Households 35-50k	317,517,721	-0.12909%	-0.5114%	-3.2844%	-5.5007%	-0.7513%	-6.251957%	-8.5998%	-5.5%
Households 50-75k	612,062,562	-0.12906%	-0.5113%	-3.2838%	-5.4996%	-0.7511%	-6.250757%	-8.5982%	-2.8%
Households 75-100k	328,458,834	-0.12874%	-0.5107%	-3.2800%	-5.4958%	-0.7503%	-6.246113%	-8.5941%	-5.3%
Households 100-150k	378,750,602	-0.12760%	-0.5089%	-3.2677%	-5.4850%	-0.7475%	-6.232446%	-8.5837%	-4.6%
Households 150k+	242,036,277	-0.12468%	-0.5044%	-3.2371%	-5.4586%	-0.7404%	-6.198987%	-8.5593%	-7.2%

Results of model 1 and 2 provide evidence that tourism industry change in Tompkins County has a very marginal impact on all types of households. Model 3, which simulates the loss of all tourism income but yields small impacts, suggests that tourism has a marginal role in Tompkins County economy. When the shock is introduced as the loss of factor income and the decline of input requirements of tourism sectors, the impacts are found to be higher as in model 4 to 6. Model 6 is probably the most informative one since it simulates tourism income loss as well as reductions in input requirements which reflect the real world situation when there is a fall in tourism demands. The top ten sectors impacted in model 6 are: 1) Entertainment and Recreation (-13.45%); 2) Tourism-related Services (-11.95); 3) Hotels and Motels (-11.81%); 4) Food and Drinking Places (-11.77%); 5) Tourism-related Retails (-11.16%); 6) Ground Passenger Transport (-6.40%); 7) Automotive Rental (-4.65%); 8) Retail Trades (-3.63%); 9) Finance and Insurance (-3.48%); and 10) Other Services (-3.05%).

I then simulated the loss of revenues in the top three largest industries in terms of output in 2009, namely Education Services, Healthcare, and Manufacturing. I found that the impact on household earned income are the greatest – about 4.5% – when the shock originates in Education Services. On the other hand, impacts from shocks in Healthcare and Manufacturing are smaller than those from tourism-related sectors. The loss of approximately $156 million income in Healthcare and Manufacturing leads to about a 2.4% and 2.3% decline of income among households respectively, compared to about a 3.3% fall from the impact of tourism-related sectors (model 3). The loss of income, combined with the 10% fall of input requirements for Education Services, Healthcare, and Manufacturing sectors, lead to household income loss of 5.3%, 3.1% and 2.9%, respectively. In model 6, the loss of $156 million from tourism together with 10% falls of tourism sectors' input requirement result in a 6.25% decrease of earned income

for all households. In comparison, it would take a loss of $190 million in Education Services, $350 million in Healthcare, and $380 million in Manufacturing, which, combined with the 10% fall of input requirements, produces the same impact on households.

In every model except model 8 in which shocks are injected directly into household, the impact are distributed evenly among all types of households. To find out what may be the cause of this pattern, I looked at the construction of SAM and how household earned incomes are derived. As has become standard for a SAM framework, any exogenous shocks would affect households indirectly through Employee Compensation and Proprietary and Other Type of Property Income, but not directly from the injected sector. I found that in the IMPLAN SAM, factor receipts for all types of households contribute about the same fixed proportions as shown in Table 5.6. This means that the distributions of factor incomes are fixed at roughly the same level for all types of households. Because of this invariant, it is not possible to capture the distributional impact of the shock. This is an artifact of the IMPLAN SAM data.

Table 5.6: Pattern of Households' Factor Receipt in IMPLAN SAM

Households	EmpCom % of tot	Proprietary Income % of tot	Other Property Income % of tot
HH LT10k	80.824%	7.881%	11.30%
HH 10-15k	80.450%	8.689%	10.86%
HH 15-25k	80.276%	9.011%	10.71%
HH 25-35k	80.212%	9.072%	10.72%
HH 35-50k	80.207%	9.128%	10.66%
HH 50-75k	80.212%	9.174%	10.61%
HH 75-100k	80.422%	9.020%	10.56%
HH 100-150k	81.211%	8.271%	10.52%
HH 150k+	83.245%	6.236%	10.52%

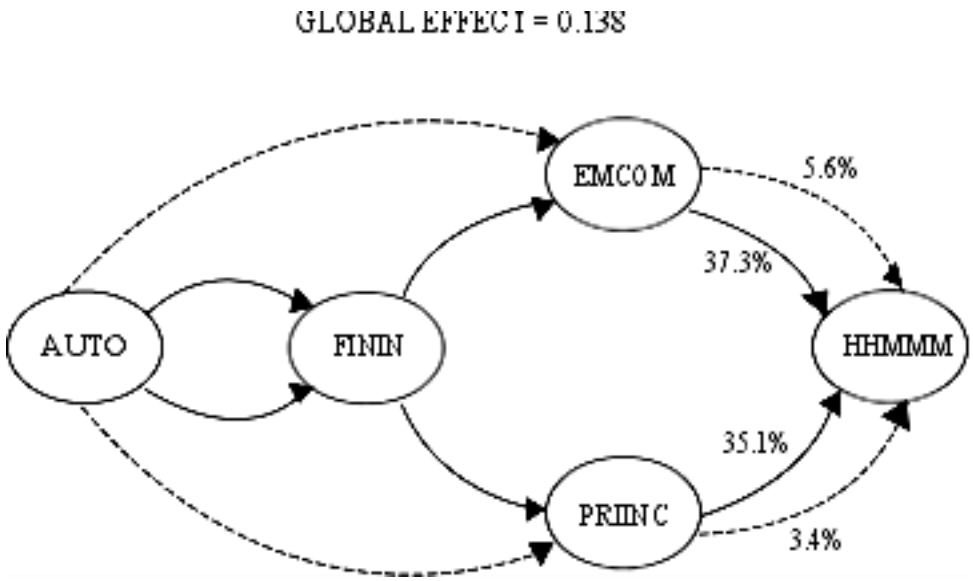
5.4 Structural Path Analysis

Results from model 4 to 6 tell us that the major contributors of impacts on households are the loss of value-added – Employee Compensation and Proprietary and Other Property Type Income. In this section, I will use SPA to explore how the impacts are transmitted from these two value-added accounts to households. Table 5.7 shows the paths of impact transmission with details on direct, total, and global influences between two value-added accounts and household groups. SPA thus shows straightforward transmission paths between the origins and the destinations. Over 90% of the impacts are transmitted from Employee Compensation while over 85% from Proprietary and Other Property Type Income, directly to all households groups.

SPA of the impact transmitted between tourism-related sectors and households groups found similar pattern. The path transmitting the largest total influence goes through Employee Compensation, while and the second-largest path goes through Proprietary and Other Property Type Income. This holds true for all tourism-related sectors except for Automotive Rental, where the path transmitting the largest impact first goes through Finance and Insurance (FININ), then Employee Compensation (EMCOM) and Proprietary and Other Property Type Income (PRINC) before reaching households. The transmission paths between Automotive Rental (AUTO) and Households $50-$75k (HHMMM) are presented in Figure 5.1. Structural Path Analysis for tourism-related sectors and two value-added accounts to households are given in Appendix B.

Table 5.7 Structural Path Analysis for Impacts Transmission between Value-added Accounts and Households Groups

Path	Global Effect	Direct Effect	Path Mult	Total Effect	% of Global	Cum %
EMCOM > HHL	0.012	0.009	1.153	0.011	92	92
EMCOM > HHLL	0.019	0.015	1.154	0.018	92	92
EMCOM > HHLLL	0.057	0.045	1.158	0.052	92.3	92.3
EMCOM > HHM	0.07	0.056	1.158	0.065	92.3	92.3
EMCOM > HHMM	0.127	0.101	1.164	0.118	92.8	92.8
EMCOM > HHRRR > HHMM		0.001	1.182	0.001	1	93.8
EMCOM > HHMMM	0.245	0.196	1.174	0.23	93.6	93.6
EMCOM > HHRR > HHMMM		0.001	1.192	0.001	0.6	94.2
EMCOM > HHRRR > HHMMM		0.002	1.192	0.003	1	95.2
EMCOM > HHR	0.132	0.105	1.166	0.123	93	93
EMCOM > HHRRR > HHR		0.001	1.184	0.001	1	94
EMCOM > HHRR	0.153	0.122	1.17	0.143	93.6	93.6
EMCOM > HHRRR > HHRR		0.001	1.187	0.002	1	94.6
EMCOM > HHRRR	0.099	0.08	1.17	0.094	94.3	94.3
PRINC > HHL	0.007	0.005	1.069	0.006	85.2	85.2
PRINC > HHLL	0.012	0.009	1.07	0.01	85.7	85.7
PRINC > HHLLL	0.035	0.028	1.078	0.03	86.5	86.5
PRINC > HHM	0.043	0.035	1.08	0.037	86.7	86.7
PRINC > HHMM	0.078	0.063	1.091	0.068	87.6	87.6
PRINC > HHMMM	0.15	0.121	1.11	0.134	89.2	89.2
PRINC > HHRRR > HHMMM		0.001	1.137	0.001	0.8	90
PRINC > HHR	0.08	0.064	1.092	0.07	87.6	87.6
PRINC > HHRR	0.089	0.071	1.098	0.078	87.4	87.4
PRINC > HHRRR	0.052	0.04	1.093	0.044	85.2	85.2



AUTO = Automotive Rental
FININ = Finance & Insurance
EMCOM = Employee Compensation
PRIINC = Proprietary and Other Property Type Income
HHMMM = Households 50 – 75k

Figure 5.1: Structural Path Analysis for Automotive Rental and Households $50-$75k

SPA also provides information about the size of the path multipliers. A large path multiplier signifies that the impact is transmitted through a path with significant links to adjacent circuits before reaching the destination pole. A larger path multiplier can be interpreted as one that takes longer to transmit impact, ceteris paribus, although strictly speaking SAM (and hence SPA) is a static framework (Defourny and Thorbecke, 1984). If this interpretation is correct, a larger path multiplier therefore creates a tradeoff between the speed and the magnitude of the impact carried from the origin to the destination. In the case of Tompkins County, the size of the multipliers or global influences of tourism related sectors on households groups tends to be relatively smaller than for other industries. Except for Ground Passenger Transport, which ranks fourth highest among 26 industries, tourism-related industries' global influences on households are not in the top ten list. I examine next the path multipliers to find out which sectors have the

tendency to transmit impacts more expeditiously. Since I am interested in impacts on households, I will look at path multipliers associated with the elementary paths that transmit influences from production activities as well as from two value-added accounts to households.

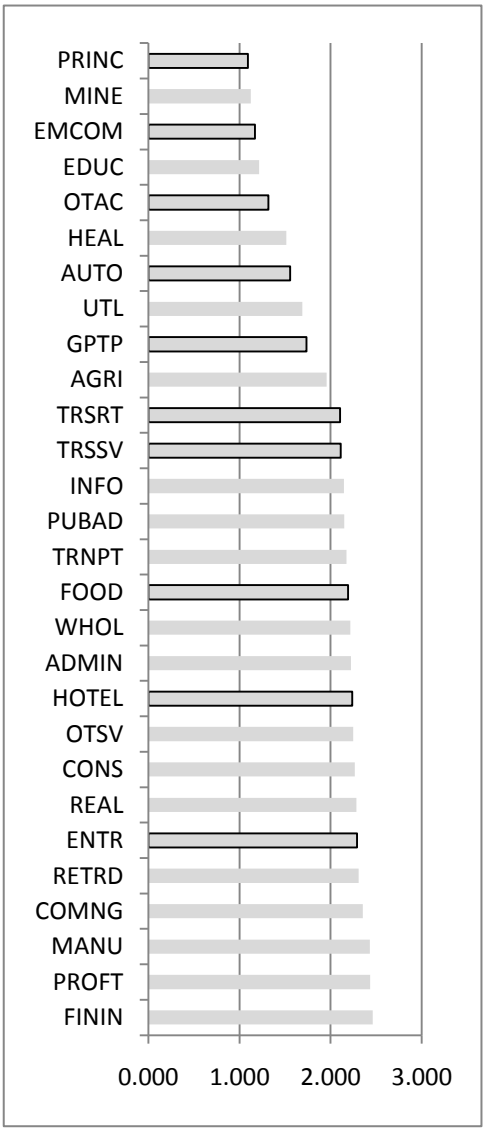


Figure 5.2: Average Path Multipliers for Elementary Paths Transmitting Impacts Through Value-added to Households

I proceeded by comparing the average path multipliers for impacts originating in tourism with those originated in other sectors. The results, illustrated in Figure 5.2, show that tourism-

related sector tend to have smaller path multipliers than other industries. This suggests that their impacts, whether it be positive or negative, tend to be realized sooner than those originating in other industries with larger path multipliers. I conclude that, in general, tourism-related sectors have relatively smaller multipliers, but their impacts appear to take shorter times to reach households.

CHAPTER 6

Conclusion and Discussion

I have found in this study that tourism appears to have a marginal role in Tompkins County economy. The estimated revenues from the eight tourism-related sectors accounted for 22% of total output, or about 2.3% of the regional gross domestic product in 2006 when the economy is strong nationwide. In 2009, almost two years after the economic crisis, while the nation experienced a 15% decline from the previous year in tourist spending, Tompkins County's tourism fell at a modest rate of 2.6% from the 2006 levels, reducing tourism income share of total output to 19% and of regional GDP to 2.1%. Between 2006 and 2009, some tourism-related sectors experienced growth, while others decline. Tompkins County's tourism industry as a whole contracted by about $4 million, or about 2.6% of the 2006 level. This contraction accounted for 0.49% of the tourism sectors' output in 2006, producing a modest fall in households' income of approximately 0.13%. Different economic model simulations further confirm the marginal impact of tourism on households' earned income. For example, model 3 simulates the scenario in which the loss of tourism revenues results in about 3.3% fall in household income.

Under the alternative assumption that a substantial portion of tourism revenues are distributed to factor payments due to the labor intensive nature, the loss of tourism income is injected directly into the two value-added accounts. This scenario produces a larger fall in households' income, and the impact is greater when combined with a 10% decline of tourism input requirements. Households' income could fall up to about 6.3% under this assumption.

Structural Path Analysis provides further information on how the impact is transmitted from the two value-added accounts – Employee Compensation and Proprietary and Other Property Type Income – to households. It appears that the impacts are transmitted directly to households as observed in the large percentage of total effects for the paths with direct transmission. For tourism-related sectors, impacts from all but one sector are largely transmitted through value-added accounts to reach households. This finding supports the hypothesis that tourism is a labor intensive industry, and any industry change would affect households expeditiously. Only Automotive Rental is found to transmit impacts through the intermediated nodes of Finance and Insurance, Employee Compensation or Proprietary and Other Property Type Income, before reaching households. This is understandable since the car rental business tends not to rely as much upon employees or labor inputs but rather on Finance and Insurance' products and services.

Apart from revealing the sizes of the direct, total, and global effects, SPA also provides information on the path multipliers. Tourism-related sectors appear to have smaller path multipliers for the paths that transmit impacts to households, which mean the repercussions of a shock in these sectors could reach households relatively quickly. This presents a potential trade-off between the magnitude and speed of impact realizations. When the shock is negative, as in the case of Tompkins County tourism industry change, the impact would reach households faster but the magnitude would be relatively smaller.

Tompkins County's economy is dominated by Education Services, and the presence of three large higher education institutes leads to the County's high quality workforce and low unemployment. However, the County's poverty rate is relatively high, and we could not be certain whether it is solely due to the large student population; or to the possibility that poverty

exists but has been masked by the impressively low unemployment rate. Whatever the case, the lack of economic diversity may hamper the region's ability to develop its full potential. Local authorities have promoted tourism activities in order to rejuvenate the economy and to generate more income and employment. However, my impact analysis suggests that, at present, tourism is a small contributor to the local economy. Investing in tourism promotion may help diversify the economy in the long-run but it may not be an effective solution for short-run development.

With regards to income distribution, I am unable to offer insights due to the lack of variability in the IMPLAN SAM data. The way the Tompkins County SAM is constructed does not allow me to analyze the impact on income distribution across the different types of households. New and better data are required to explore this issue. Further studies on the distributional impact of tourism and its potential as an income generator are highly recommended in order to assist decision makers in the selection and implementation suitable policy. Finally, a study on tourism' non-pecuniary effects, such as positive and negative externalities, on Tompkins County economy would provide a more comprehensive analysis and help policy makers design better policies.

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APPENDICES

Appendix A: 2006 SAM Multipliers for Tompkins County

	1	2	3	4	5
1. Agriculture	1.6878	0.0057	0.0042	0.0102	0.0368
2. Mining	0.0006	1.0005	0.0002	0.0008	0.0044
3.Utility	0.0345	0.0272	1.4380	0.0245	0.0313
4.Construction	0.0066	0.0025	0.0061	2.0043	0.0051
5. Manufacturing	0.3186	0.1984	0.1058	0.3909	2.1744
6. Wholesale Trade	0.0240	0.0140	0.0095	0.0246	0.0363
7. Retail Trade	0.0789	0.0629	0.0658	0.1613	0.0514
8. Transportation	0.0216	0.0167	0.0256	0.0227	0.0291
9. Information	0.0188	0.0155	0.0135	0.0262	0.0226
10. Finance and Insurance	0.0757	0.0585	0.0484	0.0772	0.0609
11. Real Estate	0.1228	0.1097	0.0654	0.0870	0.0673
12. Professional and Technical Services	0.0725	0.0790	0.0451	0.1602	0.1189
13. Company Management	0.0014	0.0046	0.0007	0.0019	0.0049
14. Administrative Services	0.0055	0.0049	0.0040	0.0099	0.0066
15. Education Services	0.0102	0.0082	0.0092	0.0091	0.0070
16. Healthcare	0.0873	0.0683	0.0743	0.0755	0.0534
17. Other Services	0.0425	0.0274	0.0273	0.0406	0.0339
18. Public Administration	0.0149	0.0118	0.0991	0.0164	0.0148
19. Tourism Related Retails	0.0109	0.0087	0.0091	0.0209	0.0071
20. Ground Passenger Transport	0.0017	0.0015	0.0014	0.0018	0.0015
21. Tourism Related Services	0.0094	0.0066	0.0078	0.0148	0.0083
22. Automotive Rental	0.0023	0.0017	0.0014	0.0023	0.0022
23. Entertainment and Recreation	0.0087	0.0162	0.0066	0.0078	0.0064
24. Hotels and Motels	0.0055	0.0041	0.0039	0.0066	0.0073
25. Other Accommodations	0.0006	0.0005	0.0005	0.0005	0.0004
26. Food and Drinking Places	0.0353	0.0278	0.0308	0.0329	0.0269
27. Employee Compensation	0.6479	0.3166	0.2534	0.4625	0.3619
28. Proprietary + Other Property Type Income	0.1196	0.4120	0.6016	0.2671	0.1314
29. Households LT10k	0.0068	0.0053	0.0058	0.0059	0.0042
30. Households 10-15k	0.0114	0.0090	0.0098	0.0099	0.0070
31. Households 15-25k	0.0335	0.0264	0.0289	0.0291	0.0205
32. Households 25-35k	0.0416	0.0329	0.0360	0.0362	0.0256
33. Households 35-50k	0.0753	0.0595	0.0651	0.0654	0.0462
34. Households 50-75k	0.1450	0.1146	0.1254	0.1260	0.0890
35. Households 75-100k	0.0779	0.0613	0.0669	0.0676	0.0478
36. Households 100-150k	0.0902	0.0698	0.0757	0.0776	0.0551
37. Households 150k+	0.0583	0.0432	0.0459	0.0492	0.0353

	6	7	8	9	10
1. Agriculture	0.0053	0.0052	0.0076	0.0054	0.0048
2. Mining	0.0003	0.0003	0.0006	0.0003	0.0002
3.Utility	0.0273	0.0359	0.0254	0.0233	0.0221
4.Construction	0.0061	0.0083	0.0062	0.0076	0.0059
5. Manufacturing	0.1537	0.1443	0.3110	0.1714	0.1147
6. Wholesale Trade	1.9638	0.0124	0.0217	0.0153	0.0107
7. Retail Trade	0.0795	2.0857	0.0753	0.0661	0.0767
8. Transportation	0.0195	0.0191	1.9252	0.0134	0.0132
9. Information	0.0291	0.0291	0.0275	1.9087	0.0242
10. Finance and Insurance	0.0787	0.0843	0.0963	0.0714	2.2201
11. Real Estate	0.1029	0.1390	0.0972	0.0988	0.0989
12. Professional and Technical Services	0.1306	0.1358	0.1232	0.2157	0.1136
13. Company Management	0.0041	0.0075	0.0026	0.0016	0.0016
14. Administrative Services	0.0157	0.0136	0.0092	0.0129	0.0084
15. Education Services	0.0104	0.0103	0.0091	0.0102	0.0103
16. Healthcare	0.0793	0.0817	0.0723	0.0703	0.0853
17. Other Services	0.0390	0.0379	0.0408	0.0412	0.0356
18. Public Administration	0.0212	0.0259	0.0318	0.0231	0.0210
19. Tourism Related Retails	0.0109	0.0118	0.0103	0.0091	0.0106
20. Ground Passenger Transport	0.0022	0.0025	0.0018	0.0033	0.0025
21. Tourism Related Services	0.0098	0.0088	0.2023	0.0078	0.0077
22. Automotive Rental	0.0030	0.0027	0.0054	0.0028	0.0044
23. Entertainment and Recreation	0.0088	0.0086	0.0077	0.0186	0.0088
24. Hotels and Motels	0.0092	0.0081	0.0061	0.0083	0.0090
25. Other Accommodations	0.0006	0.0006	0.0005	0.0005	0.0006
26. Food and Drinking Places	0.0367	0.0389	0.0444	0.0339	0.0402
27. Employee Compensation	0.4941	0.5361	0.4607	0.3876	0.3890
28. Proprietary + Other Property Type Income	0.2665	0.2297	0.2210	0.3203	0.5264
29. Households LT10k	0.0062	0.0064	0.0056	0.0055	0.0067
30. Households 10-15k	0.0104	0.0107	0.0094	0.0092	0.0112
31. Households 15-25k	0.0305	0.0314	0.0277	0.0271	0.0330
32. Households 25-35k	0.0380	0.0391	0.0344	0.0338	0.0412
33. Households 35-50k	0.0687	0.0707	0.0623	0.0610	0.0744
34. Households 50-75k	0.1323	0.1362	0.1200	0.1176	0.1434
35. Households 75-100k	0.0709	0.0731	0.0643	0.0630	0.0767
36. Households 100-150k	0.0816	0.0842	0.0741	0.0721	0.0873
37. Households 150k+	0.0518	0.0537	0.0471	0.0452	0.0539

	11	12	13	14	15
1. Agriculture	0.0047	0.0063	0.0058	0.0165	0.0066
2. Mining	0.0002	0.0004	0.0003	0.0004	0.0004
3.Utility	0.0267	0.0277	0.0500	0.0288	0.0303
4.Construction	0.0100	0.0080	0.0223	0.0055	0.0255
5. Manufacturing	0.1040	0.1860	0.1672	0.1924	0.1760
6. Wholesale Trade	0.0093	0.0142	0.0139	0.0168	0.0165
7. Retail Trade	0.0703	0.0840	0.0827	0.1129	0.0968
8. Transportation	0.0093	0.0174	0.0120	0.0180	0.0144
9. Information	0.0167	0.1193	0.0776	0.0337	0.0393
10. Finance and Insurance	0.0819	0.0880	0.0708	0.0849	0.0879
11. Real Estate	2.0827	0.1394	0.1734	0.1094	0.2216
12. Professional and Technical Services	0.0707	2.1726	0.3718	0.1246	0.1066
13. Company Management	0.0009	0.0016	1.9415	0.0032	0.0014
14. Administrative Services	0.0121	0.0259	0.0090	1.9730	0.0165
15. Education Services	0.0087	0.0110	0.0108	0.0115	1.0734
16. Healthcare	0.0726	0.0859	0.0910	0.0916	0.1066
17. Other Services	0.0349	0.0446	0.0563	0.0489	0.0509
18. Public Administration	0.0362	0.0300	0.0262	0.0236	0.0246
19. Tourism Related Retails	0.0096	0.0115	0.0114	0.0152	0.0134
20. Ground Passenger Transport	0.0019	0.0036	0.0021	0.0033	0.0039
21. Tourism Related Services	0.0065	0.0094	0.0078	0.0112	0.0095
22. Automotive Rental	0.0018	0.0036	0.0076	0.0038	0.0031
23. Entertainment and Recreation	0.0069	0.0159	0.0096	0.0108	0.0125
24. Hotels and Motels	0.0084	0.0178	0.0070	0.0112	0.0096
25. Other Accommodations	0.0016	0.0006	0.0007	0.0006	0.0008
26. Food and Drinking Places	0.0306	0.0489	0.0383	0.0470	0.0442
27. Employee Compensation	0.1540	0.5096	0.5953	0.6143	0.7757
28. Proprietary + Other Property Type Income	0.7435	0.3297	0.2585	0.2333	0.1663
29. Households LT10k	0.0057	0.0067	0.0071	0.0072	0.0083
30. Households 10-15k	0.0096	0.0112	0.0119	0.0120	0.0139
31. Households 15-25k	0.0283	0.0330	0.0350	0.0351	0.0407
32. Households 25-35k	0.0353	0.0411	0.0435	0.0437	0.0507
33. Households 35-50k	0.0638	0.0743	0.0787	0.0791	0.0916
34. Households 50-75k	0.1230	0.1433	0.1517	0.1524	0.1765
35. Households 75-100k	0.0655	0.0768	0.0814	0.0818	0.0948
36. Households 100-150k	0.0735	0.0881	0.0937	0.0943	0.1097
37. Households 150k+	0.0436	0.0557	0.0598	0.0603	0.0708

	16	17	18	19	20
1. Agriculture	0.0075	0.0078	0.0074	0.0051	0.0074
2. Mining	0.0006	0.0005	0.0004	0.0003	0.0005
3.Utility	0.0344	0.0368	0.0370	0.0349	0.0261
4.Construction	0.0131	0.0154	0.0129	0.0080	0.0042
5. Manufacturing	0.2923	0.2637	0.1899	0.1398	0.2541
6. Wholesale Trade	0.0215	0.0197	0.0168	0.0120	0.0232
7. Retail Trade	0.0629	0.0899	0.1153	0.0841	0.0974
8. Transportation	0.0187	0.0166	0.0166	0.0186	0.0186
9. Information	0.0404	0.0363	0.0236	0.0283	0.0240
10. Finance and Insurance	0.1044	0.0767	0.0810	0.0819	0.1123
11. Real Estate	0.1874	0.1755	0.1157	0.1351	0.0998
12. Professional and Technical Services	0.1832	0.1257	0.0756	0.1324	0.1021
13. Company Management	0.0037	0.0023	0.0013	0.0073	0.0024
14. Administrative Services	0.0325	0.0181	0.0075	0.0133	0.0071
15. Education Services	0.0093	0.0115	0.0152	0.0099	0.0117
16. Healthcare	1.3740	0.0824	0.1306	0.0787	0.0997
17. Other Services	0.0388	2.0053	0.0477	0.0367	0.0447
18. Public Administration	0.0438	0.0366	1.9115	0.0245	0.2137
19. Tourism Related Retails	0.0085	0.0122	0.0160	1.8662	0.0134
20. Ground Passenger Transport	0.0044	0.0036	0.0025	0.0024	1.5351
21. Tourism Related Services	0.0077	0.0094	0.0112	0.0085	0.0237
22. Automotive Rental	0.0032	0.0031	0.0027	0.0026	0.0046
23. Entertainment and Recreation	0.0082	0.0110	0.0115	0.0083	0.0092
24. Hotels and Motels	0.0107	0.0095	0.0067	0.0079	0.0063
25. Other Accommodations	0.0005	0.0006	0.0009	0.0006	0.0007
26. Food and Drinking Places	0.0572	0.0386	0.0516	0.0376	0.0406
27. Employee Compensation	0.3437	0.5517	0.9553	0.5020	0.6670
28. Proprietary + Other Property Type Income	0.2022	0.2096	0.2032	0.2461	0.2594
29. Households LT10k	0.0044	0.0064	0.0102	0.0062	0.0078
30. Households 10-15k	0.0074	0.0107	0.0171	0.0103	0.0131
31. Households 15-25k	0.0217	0.0316	0.0501	0.0303	0.0383
32. Households 25-35k	0.0270	0.0393	0.0624	0.0377	0.0477
33. Households 35-50k	0.0488	0.0710	0.1127	0.0682	0.0862
34. Households 50-75k	0.0941	0.1369	0.2172	0.1314	0.1662
35. Households 75-100k	0.0505	0.0734	0.1166	0.0705	0.0892
36. Households 100-150k	0.0580	0.0847	0.1350	0.0811	0.1028
37. Households 150k+	0.0367	0.0542	0.0871	0.0516	0.0657

	21	22	23	24	25
1. Agriculture	0.0052	0.0051	0.0295	0.0052	0.0059
2. Mining	0.0003	0.0003	0.0003	0.0003	0.0004
3.Utility	0.0353	0.0230	0.0369	0.0514	0.0888
4.Construction	0.0075	0.0070	0.0144	0.0182	0.0373
5. Manufacturing	0.1461	0.1405	0.1560	0.1444	0.1934
6. Wholesale Trade	0.0121	0.0120	0.0157	0.0127	0.0163
7. Retail Trade	0.0795	0.0888	0.0710	0.0840	0.0707
8. Transportation	0.0160	0.0152	0.0144	0.0145	0.0175
9. Information	0.0346	0.0269	0.0304	0.0339	0.0365
10. Finance and Insurance	0.0714	1.8215	0.0809	0.0838	0.0688
11. Real Estate	0.1170	0.1035	0.1370	0.1215	0.1964
12. Professional and Technical Services	0.1513	0.1213	0.1369	0.1299	0.1310
13. Company Management	0.0044	0.0019	0.0026	0.0038	0.0030
14. Administrative Services	0.0127	0.0095	0.0149	0.0111	0.0151
15. Education Services	0.0103	0.0099	0.0118	0.0100	0.0082
16. Healthcare	0.0802	0.0822	0.0725	0.0825	0.0660
17. Other Services	0.0368	0.0419	0.0444	0.0480	0.0630
18. Public Administration	0.1736	0.0258	0.0230	0.0364	0.0461
19. Tourism Related Retails	0.0109	0.0121	0.0097	0.0115	0.0096
20. Ground Passenger Transport	0.0022	0.0035	0.0024	0.0079	0.0022
21. Tourism Related Services	1.8757	0.0207	0.0100	0.0649	0.0114
22. Automotive Rental	0.0031	1.1932	0.0031	0.0025	0.0025
23. Entertainment and Recreation	0.0085	0.0091	2.0267	0.0089	0.0094
24. Hotels and Motels	0.0079	0.0111	0.0068	1.9848	0.0163
25. Other Accommodations	0.0006	0.0006	0.0005	0.0006	1.1687
26. Food and Drinking Places	0.0371	0.0401	0.0336	0.0388	0.0368
27. Employee Compensation	0.4373	0.3862	0.4164	0.4601	0.3473
28. Proprietary + Other Property Type Income	0.3742	0.4874	0.2959	0.3683	0.3294
29. Households LT10k	0.0063	0.0064	0.0056	0.0065	0.0052
30. Households 10-15k	0.0105	0.0108	0.0094	0.0108	0.0087
31. Households 15-25k	0.0309	0.0318	0.0277	0.0318	0.0255
32. Households 25-35k	0.0385	0.0396	0.0345	0.0397	0.0318
33. Households 35-50k	0.0696	0.0716	0.0624	0.0717	0.0574
34. Households 50-75k	0.1342	0.1380	0.1203	0.1381	0.1106
35. Households 75-100k	0.0719	0.0738	0.0645	0.0740	0.0592
36. Households 100-150k	0.0823	0.0841	0.0739	0.0847	0.0677
37. Households 150k+	0.0516	0.0521	0.0466	0.0532	0.0423

	26	27	28	29	30
1. Agriculture	0.0203	0.0078	0.0046	0.0134	0.0136
2. Mining	0.0007	0.0004	0.0002	0.0006	0.0006
3.Utility	0.0414	0.0311	0.0187	0.0649	0.0639
4.Construction	0.0097	0.0038	0.0023	0.0063	0.0061
5. Manufacturing	0.3254	0.1779	0.1065	0.3121	0.3058
6. Wholesale Trade	0.0295	0.0170	0.0102	0.0292	0.0288
7. Retail Trade	0.0774	0.1294	0.0775	0.2213	0.2038
8. Transportation	0.0194	0.0127	0.0076	0.0211	0.0201
9. Information	0.0255	0.0241	0.0144	0.0396	0.0388
10. Finance and Insurance	0.0767	0.0864	0.0517	0.1160	0.1243
11. Real Estate	0.1276	0.1246	0.0745	0.2063	0.1954
12. Professional and Technical Services	0.0956	0.0598	0.0358	0.1005	0.0996
13. Company Management	0.0013	0.0013	0.0008	0.0023	0.0022
14. Administrative Services	0.0072	0.0065	0.0039	0.0115	0.0110
15. Education Services	0.0089	0.0171	0.0101	0.0198	0.0226
16. Healthcare	0.0736	0.1477	0.0883	0.2891	0.2700
17. Other Services	0.0369	0.0522	0.0311	0.0762	0.0807
18. Public Administration	0.0259	0.0194	0.0116	0.0330	0.0319
19. Tourism Related Retails	0.0105	0.0179	0.0107	0.0307	0.0283
20. Ground Passenger Transport	0.0019	0.0027	0.0016	0.0053	0.0050
21. Tourism Related Services	0.0092	0.0110	0.0066	0.0177	0.0167
22. Automotive Rental	0.0021	0.0027	0.0016	0.0040	0.0039
23. Entertainment and Recreation	0.0209	0.0127	0.0076	0.0174	0.0199
24. Hotels and Motels	0.0075	0.0071	0.0042	0.0090	0.0097
25. Other Accommodations	0.0005	0.0010	0.0006	0.0011	0.0012
26. Food and Drinking Places	1.9549	0.0575	0.0344	0.0755	0.0791
27. Employee Compensation	0.4832	1.1519	0.0908	0.2484	0.2444
28. Proprietary + Other Property Type Income	0.2068	0.1108	1.0662	0.1837	0.1795
29. Households LT10k	0.0058	0.0116	0.0069	1.0036	0.0035
30. Households 10-15k	0.0096	0.0193	0.0117	0.0060	1.0058
31. Households 15-25k	0.0283	0.0566	0.0346	0.0176	0.0170
32. Households 25-35k	0.0352	0.0704	0.0431	0.0220	0.0212
33. Households 35-50k	0.0637	0.1273	0.0780	0.0397	0.0383
34. Households 50-75k	0.1227	0.2453	0.1502	0.0765	0.0738
35. Households 75-100k	0.0658	0.1318	0.0799	0.0410	0.0395
36. Households 100-150k	0.0759	0.1530	0.0890	0.0470	0.0453
37. Households 150k+	0.0484	0.0995	0.0518	0.0296	0.0285

	31	32	33	34	35
1. Agriculture	0.0133	0.0120	0.0118	0.0103	0.0099
2. Mining	0.0006	0.0005	0.0005	0.0005	0.0005
3.Utility	0.0623	0.0514	0.0469	0.0415	0.0364
4.Construction	0.0060	0.0053	0.0053	0.0049	0.0052
5. Manufacturing	0.2985	0.2696	0.2722	0.2364	0.2262
6. Wholesale Trade	0.0281	0.0254	0.0262	0.0231	0.0213
7. Retail Trade	0.1989	0.1848	0.2022	0.1775	0.1656
8. Transportation	0.0196	0.0182	0.0183	0.0167	0.0174
9. Information	0.0378	0.0347	0.0355	0.0319	0.0323
10. Finance and Insurance	0.1213	0.1199	0.1341	0.1186	0.1148
11. Real Estate	0.1907	0.1678	0.1815	0.1652	0.1703
12. Professional and Technical Services	0.0972	0.0873	0.0862	0.0788	0.0799
13. Company Management	0.0021	0.0019	0.0020	0.0017	0.0017
14. Administrative Services	0.0107	0.0093	0.0092	0.0084	0.0089
15. Education Services	0.0220	0.0181	0.0184	0.0215	0.0284
16. Healthcare	0.2635	0.2198	0.2060	0.1839	0.1998
17. Other Services	0.0788	0.0743	0.0670	0.0644	0.0773
18. Public Administration	0.0311	0.0278	0.0278	0.0251	0.0264
19. Tourism Related Retails	0.0276	0.0256	0.0280	0.0246	0.0229
20. Ground Passenger Transport	0.0048	0.0041	0.0038	0.0032	0.0038
21. Tourism Related Services	0.0163	0.0151	0.0166	0.0149	0.0148
22. Automotive Rental	0.0038	0.0036	0.0039	0.0035	0.0039
23. Entertainment and Recreation	0.0194	0.0173	0.0171	0.0160	0.0186
24. Hotels and Motels	0.0095	0.0087	0.0086	0.0088	0.0111
25. Other Accommodations	0.0012	0.0012	0.0012	0.0012	0.0017
26. Food and Drinking Places	0.0772	0.0765	0.0902	0.0807	0.0763
27. Employee Compensation	0.2385	0.2156	0.2210	0.2002	0.2049
28. Proprietary + Other Property Type Income	0.1752	0.1571	0.1640	0.1474	0.1472
29. Households LT10k	0.0034	0.0031	0.0032	0.0029	0.0031
30. Households 10-15k	0.0057	0.0052	0.0053	0.0049	0.0052
31. Households 15-25k	1.0166	0.0152	0.0156	0.0143	0.0153
32. Households 25-35k	0.0207	1.0189	0.0194	0.0178	0.0191
33. Households 35-50k	0.0374	0.0342	1.0351	0.0322	0.0345
34. Households 50-75k	0.0721	0.0659	0.0676	1.0620	0.0665
35. Households 75-100k	0.0386	0.0353	0.0362	0.0332	1.0356
36. Households 100-150k	0.0442	0.0405	0.0415	0.0380	0.0408
37. Households 150k+	0.0279	0.0255	0.0261	0.0239	0.0257

	36	37
1. Agriculture	0.0096	0.0093
2. Mining	0.0004	0.0004
3.Utility	0.0355	0.0346
4.Construction	0.0051	0.0049
5. Manufacturing	0.2204	0.2132
6. Wholesale Trade	0.0207	0.0201
7. Retail Trade	0.1613	0.1560
8. Transportation	0.0169	0.0163
9. Information	0.0314	0.0303
10. Finance and Insurance	0.1118	0.1078
11. Real Estate	0.1657	0.1595
12. Professional and Technical Services	0.0778	0.0750
13. Company Management	0.0017	0.0016
14. Administrative Services	0.0086	0.0083
15. Education Services	0.0275	0.0262
16. Healthcare	0.1945	0.1873
17. Other Services	0.0752	0.0720
18. Public Administration	0.0257	0.0248
19. Tourism Related Retails	0.0224	0.0216
20. Ground Passenger Transport	0.0037	0.0035
21. Tourism Related Services	0.0144	0.0139
22. Automotive Rental	0.0038	0.0036
23. Entertainment and Recreation	0.0181	0.0174
24. Hotels and Motels	0.0108	0.0103
25. Other Accommodations	0.0016	0.0016
26. Food and Drinking Places	0.0743	0.0717
27. Employee Compensation	0.1995	0.1922
28. Proprietary + Other Property Type Income	0.1434	0.1382
29. Households LT10k	0.0032	0.0040
30. Households 10-15k	0.0054	0.0066
31. Households 15-25k	0.0157	0.0192
32. Households 25-35k	0.0196	0.0239
33. Households 35-50k	0.0354	0.0431
34. Households 50-75k	0.0682	0.0829
35. Households 75-100k	0.0365	0.0443
36. Households 100-150k	1.0418	0.0508
37. Households 150k+	0.0264	1.0320

Appendix B: Structural Path Analysis for Tourism Sectors and Value-added Accounts to Households

Path	Global Effect	Direct Effect	Path Mult	Total Effect	% of Global	Cum %
TRSRT > EMCOM > HHL	0.006	0.002	2.143	0.004	63.7	63.7
TRSRT > EMCOM > HHLL	0.01	0.003	2.144	0.007	63.4	63.4
TRSRT > EMCOM > HHLLL	0.03	0.009	2.151	0.019	63.5	63.5
TRSRT > PRINC > HHLLL		0.002	2.008	0.004	13.1	76.5
TRSRT > EMCOM > HHM	0.038	0.011	2.153	0.024	63.5	63.5
TRSRT > PRINC > HHM		0.002	2.011	0.005	13.1	76.6
TRSRT > EMCOM > HHMM	0.068	0.02	2.163	0.043	63.8	63.8
TRSRT > PRINC > HHMM		0.004	2.032	0.009	13.3	77.1
TRSRT > EMCOM > HHMMM	0.131	0.039	2.181	0.085	64.3	64.3
TRSRT > PRINC > HHMMM		0.009	2.067	0.018	13.5	77.8
TRSRT > EMCOM > HHR	0.07	0.021	2.166	0.045	64.1	64.1
TRSRT > PRINC > HHR		0.005	2.035	0.009	13.1	77.3
TRSRT > EMCOM > HHRR	0.081	0.024	2.173	0.053	65.1	65.1
TRSRT > PRINC > HHRR		0.005	2.045	0.01	12.7	77.8
TRSRT > EMCOM > HHRRR	0.052	0.016	2.173	0.035	67	67
TRSRT > PRINC > HHRRR		0.003	2.037	0.006	11.3	78.4
GPTP > EMCOM > HHL	0.008	0.003	1.768	0.005	58.9	58.9
GPTP > EMCOM > HHLL	0.013	0.004	1.769	0.008	58.7	58.7
GPTP > EMCOM > HHLLL	0.038	0.013	1.775	0.023	58.8	58.8
GPTP > PRINC > HHLLL		0.003	1.654	0.004	11	69.8
GPTP > PUBAD > EMCOM > HHLLL		0.001	3.364	0.004	11.5	81.3
GPTP > EMCOM > HHM	0.048	0.016	1.777	0.028	58.8	58.8
GPTP > PRINC > HHM		0.003	1.657	0.005	11.1	69.8
GPTP > PUBAD > EMCOM > HHM		0.002	3.367	0.005	11.5	81.3
GPTP > EMCOM > HHMM	0.086	0.029	1.785	0.051	59.1	59.1
GPTP > PRINC > HHMM		0.006	1.674	0.01	11.2	70.3
GPTP > PUBAD > EMCOM > HHMM		0.003	3.383	0.01	11.5	81.8
GPTP > EMCOM > HHMMM	0.166	0.055	1.8	0.099	59.6	59.6
GPTP > PRINC > HHMMM		0.011	1.703	0.019	11.4	71
GPTP > PUBAD > EMCOM > HHMMM		0.006	3.412	0.019	11.6	82.6
GPTP > EMCOM > HHR	0.089	0.03	1.788	0.053	59.4	59.4
GPTP > PRINC > HHR		0.006	1.676	0.01	11.1	70.4
GPTP > PUBAD > EMCOM > HHR		0.003	3.388	0.01	11.6	82
GPTP > EMCOM > HHRR	0.103	0.034	1.793	0.062	60.1	60.1
GPTP > PRINC > HHRR		0.007	1.685	0.011	10.7	70.8
GPTP > PUBAD > EMCOM > HHRR		0.004	3.399	0.012	11.7	82.5
GPTP > EMCOM > HHRRR	0.066	0.023	1.794	0.041	61.6	61.6
GPTP > PRINC > HHRRR		0.004	1.678	0.006	9.5	71.1

Path	Global Effect	Direct Effect	Path Mult	Total Effect	% of Global	Cum %
GPTP > PUBAD > EMCOM > HHRRR		0.002	3.4	0.008	12	83.1
TRSSV > EMCOM > HHL	0.006	0.001	2.158	0.003	40.6	40.6
TRSSV > EMCOM > HHLL	0.011	0.002	2.159	0.004	40.3	40.3
TRSSV > PRINC > HHLL		0.001	2.005	0.003	24.7	65
TRSSV > EMCOM > HHLLL	0.031	0.006	2.166	0.012	40.3	40.3
TRSSV > PRINC > HHLLL		0.004	2.019	0.008	25	65.3
TRSSV > EMCOM > HHM	0.039	0.007	2.168	0.016	40.3	40.3
TRSSV > PRINC > HHM		0.005	2.022	0.01	25.1	65.4
TRSSV > PUBAD > EMCOM > HHM		0.001	4.109	0.004	11.5	76.9
TRSSV > EMCOM > HHMM	0.07	0.013	2.178	0.028	40.5	40.5
TRSSV > PRINC > HHMM		0.009	2.043	0.018	25.4	65.9
TRSSV > PUBAD > EMCOM > HHMM		0.002	4.128	0.008	11.6	77.4
TRSSV > EMCOM > HHMMM	0.134	0.025	2.197	0.055	40.8	40.8
TRSSV > PRINC > HHMMM		0.017	2.079	0.035	25.9	66.7
TRSSV > PUBAD > EMCOM > HHMMM		0.004	4.163	0.016	11.7	78.3
TRSSV > EMCOM > HHR	0.072	0.013	2.182	0.029	40.7	40.7
TRSSV > PRINC > HHR		0.009	2.046	0.018	25.2	66
TRSSV > PUBAD > EMCOM > HHR		0.002	4.134	0.008	11.6	77.6
TRSSV > EMCOM > HHRR	0.082	0.016	2.188	0.034	41.6	41.6
TRSSV > PRINC > HHRR		0.01	2.056	0.02	24.5	66.1
TRSSV > PUBAD > EMCOM > HHRR		0.002	4.147	0.01	11.9	78
TRSSV > EMCOM > HHRRR	0.052	0.01	2.189	0.022	43.4	43.4
TRSSV > PRINC > HHRRR		0.006	2.048	0.011	22.2	65.6
TRSSV > PUBAD > EMCOM > HHRRR		0.002	4.148	0.006	12.4	78
AUTO > FININ > EMCOM > HHLL	0.011	0.001	3.006	0.004	37	37
AUTO > FININ > PRINC > HHLL		0.001	2.793	0.004	33.7	70.6
AUTO > EMCOM > HHLLL	0.032	0.001	1.38	0.002	5.5	5.5
AUTO > FININ > EMCOM > HHLLL		0.004	3.014	0.012	36.9	42.4
AUTO > FININ > PRINC > HHLLL		0.004	2.811	0.011	34.1	76.5
AUTO > EMCOM > HHM	0.04	0.002	1.381	0.002	5.5	5.5
AUTO > PRINC > HHM		0.001	1.287	0.001	3.3	8.8
AUTO > FININ > EMCOM > HHM		0.005	3.016	0.015	36.9	45.7
AUTO > FININ > PRINC > HHM		0.005	2.815	0.014	34.2	79.9
AUTO > EMCOM > HHMM	0.072	0.003	1.388	0.004	5.6	5.6
AUTO > PRINC > HHMM		0.002	1.301	0.002	3.3	8.9
AUTO > FININ > EMCOM > HHMM		0.009	3.028	0.026	37	45.9
AUTO > FININ > PRINC > HHMM		0.009	2.842	0.025	34.6	80.4
AUTO > EMCOM > HHMMM	0.138	0.006	1.4	0.008	5.6	5.6
AUTO > PRINC > HHMMM		0.004	1.324	0.005	3.4	9

Path	Global Effect	Direct Effect	Path Mult	Total Effect	% of Global	Cum %
AUTO > FININ > EMCOM > HHMMM		0.017	3.051	0.051	37.3	46.3
AUTO > FININ > PRINC > HHMMM		0.017	2.888	0.048	35.1	81.4
AUTO > EMCOM > HHR	0.074	0.003	1.39	0.004	5.6	5.6
AUTO > PRINC > HHR		0.002	1.302	0.002	3.3	8.9
AUTO > FININ > EMCOM > HHR		0.009	3.034	0.028	37.3	46.2
AUTO > FININ > PRINC > HHR		0.009	2.846	0.025	34.4	80.5
AUTO > EMCOM > HHRR	0.084	0.003	1.394	0.005	5.7	5.7
AUTO > PRINC > HHRR		0.002	1.309	0.003	3.2	8.9
AUTO > FININ > EMCOM > HHRR		0.011	3.043	0.032	38.2	47.2
AUTO > FININ > PRINC > HHRR		0.01	2.86	0.028	33.5	80.7
AUTO > EMCOM > HHRRR	0.052	0.002	1.394	0.003	6.1	6.1
AUTO > PRINC > HHRRR		0.001	1.303	0.002	2.9	9
AUTO > FININ > EMCOM > HHRRR		0.007	3.045	0.021	40.5	49.5
AUTO > FININ > PRINC > HHRRR		0.006	2.85	0.016	30.7	80.2
ENTR > EMCOM > HHL	0.006	0.001	2.332	0.003	51.9	51.9
ENTR > EMCOM > HHLL	0.009	0.002	2.333	0.005	51.6	51.6
ENTR > EMCOM > HHLLL	0.028	0.006	2.34	0.014	51.6	51.6
ENTR > PRINC > HHLLL		0.002	2.182	0.005	19.4	71
ENTR > EMCOM > HHM	0.035	0.008	2.342	0.018	51.6	51.6
ENTR > PRINC > HHM		0.003	2.186	0.007	19.5	71.1
ENTR > EMCOM > HHMM	0.062	0.014	2.354	0.032	51.8	51.8
ENTR > PRINC > HHMM		0.006	2.208	0.012	19.7	71.5
ENTR > EMCOM > HHMMM	0.12	0.027	2.374	0.063	52.3	52.3
ENTR > PRINC > HHMMM		0.011	2.246	0.024	20.1	72.3
ENTR > EMCOM > HHR	0.064	0.014	2.357	0.034	52.1	52.1
ENTR > PRINC > HHR		0.006	2.211	0.013	19.6	71.7
ENTR > EMCOM > HHRR	0.074	0.017	2.365	0.039	53.1	53.1
ENTR > PRINC > HHRR		0.006	2.222	0.014	19	72.1
ENTR > EMCOM > HHRRR	0.047	0.011	2.365	0.026	55.2	55.2
ENTR > PRINC > HHRRR		0.004	2.213	0.008	17.1	72.3
HOTEL > EMCOM > HHL	0.006	0.001	2.285	0.003	50.8	50.8
HOTEL > EMCOM > HHLL	0.011	0.002	2.287	0.005	50.5	50.5
HOTEL > PRINC > HHLL		0.001	2.123	0.002	22.4	72.9
HOTEL > EMCOM > HHLLL	0.032	0.007	2.294	0.016	50.5	50.5
HOTEL > PRINC > HHLLL		0.003	2.138	0.007	22.7	73.2
HOTEL > EMCOM > HHM	0.04	0.009	2.296	0.02	50.5	50.5
HOTEL > PRINC > HHM		0.004	2.141	0.009	22.8	73.3
HOTEL > EMCOM > HHMM	0.072	0.016	2.307	0.036	50.7	50.7
HOTEL > PRINC > HHMM		0.008	2.163	0.017	23.1	73.8

Path	Global Effect	Direct Effect	Path Mult	Total Effect	% of Global	Cum %
HOTEL > EMCOM > HHMMM	0.138	0.03	2.327	0.071	51.1	51.1
HOTEL > PRINC > HHMMM		0.015	2.201	0.032	23.5	74.6
HOTEL > EMCOM > HHR	0.074	0.016	2.31	0.038	51	51
HOTEL > PRINC > HHR		0.008	2.166	0.017	22.9	73.9
HOTEL > EMCOM > HHRR	0.085	0.019	2.318	0.044	52	52
HOTEL > PRINC > HHRR		0.009	2.177	0.019	22.3	74.3
HOTEL > EMCOM > HHRRR	0.053	0.012	2.318	0.029	54.3	54.3
HOTEL > PRINC > HHRRR		0.005	2.168	0.011	20.1	74.4
OTAC > EMCOM > HHL	0.005	0.001	1.347	0.002	38.5	38.5
OTAC > EMCOM > HHLL	0.009	0.002	1.348	0.003	38.2	38.2
OTAC > PRINC > HHLL		0.001	1.251	0.002	19.7	57.9
OTAC > EMCOM > HHLLL	0.025	0.007	1.352	0.01	38.2	38.2
OTAC > PRINC > HHLLL		0.004	1.26	0.005	20	58.2
OTAC > EMCOM > HHM	0.032	0.009	1.354	0.012	38.2	38.2
OTAC > PRINC > HHM		0.005	1.262	0.006	20.1	58.2
OTAC > EMCOM > HHMM	0.057	0.016	1.36	0.022	38.3	38.3
OTAC > PRINC > HHMM		0.009	1.275	0.012	20.3	58.6
OTAC > UTIL > PRINC > HHMM		0.001	1.818	0.002	3.2	61.8
OTAC > REAL > PRINC > HHMM		0.001	2.586	0.003	5.2	67.1
OTAC > EMCOM > HHMMM	0.111	0.031	1.372	0.043	38.7	38.7
OTAC > PRINC > HHMMM		0.018	1.297	0.023	20.7	59.3
OTAC > UTIL > PRINC > HHMMM		0.002	1.85	0.004	3.3	62.6
OTAC > REAL > PRINC > HHMMM		0.002	2.631	0.006	5.3	67.9
OTAC > PROFT > EMCOM > HHMMM		0.001	2.941	0.003	3	70.9
OTAC > PUBAD > EMCOM > HHMMM		0.001	2.6	0.003	2.5	73.4
OTAC > EMCOM > HHR	0.059	0.017	1.362	0.023	38.6	38.6
OTAC > PRINC > HHR		0.009	1.276	0.012	20.2	58.8
OTAC > UTIL > PRINC > HHR		0.001	1.821	0.002	3.2	61.9
OTAC > REAL > PRINC > HHR		0.001	2.59	0.003	5.2	67.1
OTAC > EMCOM > HHRR	0.068	0.02	1.366	0.027	39.4	39.4
OTAC > PRINC > HHRR		0.01	1.283	0.013	19.6	59.1
OTAC > UTIL > PRINC > HHRR		0.001	1.831	0.002	3.1	62.2
OTAC > REAL > PRINC > HHRR		0.001	2.603	0.003	5	67.2
OTAC > EMCOM > HHRRR	0.042	0.013	1.367	0.017	41.3	41.3
OTAC > PRINC > HHRRR		0.006	1.277	0.008	17.8	59.1
FOOD > EMCOM > HHL	0.006	0.002	2.226	0.004	61.2	61.2
FOOD > EMCOM > HHLL	0.01	0.003	2.228	0.006	61	61
FOOD > EMCOM > HHLLL	0.028	0.008	2.235	0.017	61.1	61.1
FOOD > PRINC > HHLLL		0.001	2.098	0.003	9.8	70.8

Path	Global Effect	Direct Effect	Path Mult	Total Effect	% of Global	Cum %
FOOD > EMCOM > HHM	0.035	0.01	2.236	0.022	61.1	61.1
FOOD > PRINC > HHM		0.002	2.101	0.003	9.8	70.9
FOOD > EMCOM > HHMM	0.064	0.017	2.247	0.039	61.3	61.3
FOOD > PRINC > HHMM		0.003	2.121	0.006	9.9	71.3
FOOD > EMCOM > HHMMM	0.123	0.034	2.265	0.076	61.9	61.9
FOOD > PRINC > HHMMM		0.006	2.155	0.012	10.1	72
FOOD > MANU > EMCOM > HHMMM		0.001	4.791	0.006	5.1	77
FOOD > EMCOM > HHR	0.066	0.018	2.25	0.041	61.6	61.6
FOOD > PRINC > HHR		0.003	2.124	0.006	9.9	71.5
FOOD > EMCOM > HHRR	0.076	0.021	2.257	0.047	62.5	62.5
FOOD > PRINC > HHRR		0.003	2.135	0.007	9.5	72
FOOD > EMCOM > HHRRR	0.048	0.014	2.258	0.031	64.2	64.2
FOOD > PRINC > HHRRR		0.002	2.127	0.004	8.5	72.6
EMCOM > HHL	0.012	0.009	1.153	0.011	92	92
EMCOM > HHLL	0.019	0.015	1.154	0.018	92	92
EMCOM > HHLLL	0.057	0.045	1.158	0.052	92.3	92.3
EMCOM > HHM	0.07	0.056	1.158	0.065	92.3	92.3
EMCOM > HHMM	0.127	0.101	1.164	0.118	92.8	92.8
EMCOM > HHRRR > HHMM		0.001	1.182	0.001	1	93.8
EMCOM > HHMMM	0.245	0.196	1.174	0.23	93.6	93.6
EMCOM > HHRR > HHMMM		0.001	1.192	0.001	0.6	94.2
EMCOM > HHRRR > HHMMM		0.002	1.192	0.003	1	95.2
EMCOM > HHR	0.132	0.105	1.166	0.123	93	93
EMCOM > HHRRR > HHR		0.001	1.184	0.001	1	94
EMCOM > HHRR	0.153	0.122	1.17	0.143	93.6	93.6
EMCOM > HHRRR > HHRR		0.001	1.187	0.002	1	94.6
EMCOM > HHRRR	0.099	0.08	1.17	0.094	94.3	94.3
PRINC > HHL	0.007	0.005	1.069	0.006	85.2	85.2
PRINC > HHLL	0.012	0.009	1.07	0.01	85.7	85.7
PRINC > HHLLL	0.035	0.028	1.078	0.03	86.5	86.5
PRINC > HHM	0.043	0.035	1.08	0.037	86.7	86.7
PRINC > HHMM	0.078	0.063	1.091	0.068	87.6	87.6
PRINC > HHMMM	0.15	0.121	1.11	0.134	89.2	89.2
PRINC > HHRRR > HHMMM		0.001	1.137	0.001	0.8	90
PRINC > HHR	0.08	0.064	1.092	0.07	87.6	87.6
PRINC > HHRR	0.089	0.071	1.098	0.078	87.4	87.4
PRINC > HHRRR	0.052	0.04	1.093	0.044	85.2	85.2